



# Armed Forces College of Medicine

## AFCM



***PHARYNX and LARYNX***  
By  
**Prof. Dr.: Eman Habib**

# INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. Identify general features of pharynx
2. Enumerate the cartilages of larynx
3. Identify laryngeal ligaments & membranes.
4. Identify laryngeal cavity, boundaries of inlet & rima glottidis.
5. State the sensory nerve supply of larynx.
6. Name intrinsic muscles of larynx ,their actions and nerve supply.

# Lecture Plan



1. Part 1 (5 min) Introduction to pharynx
2. Part 2 (35 min) larynx
3. Part 3 (5 min) applied anatomy
4. Lecture Quiz (5 min)

# Anatomy of the Pharynx



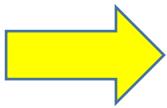
# THE PHARYNX



**Definition:** it is a half-cylinder muscular tube

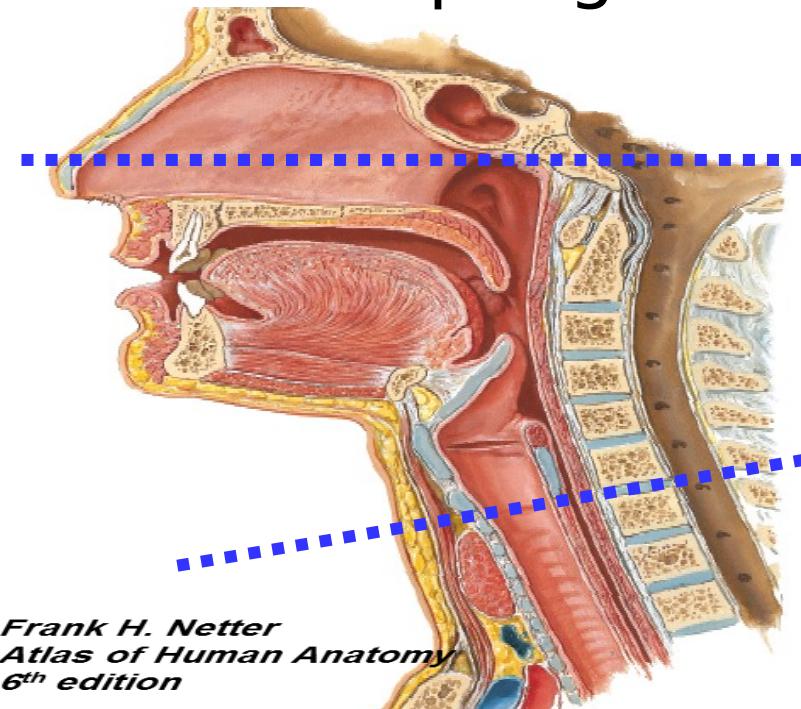
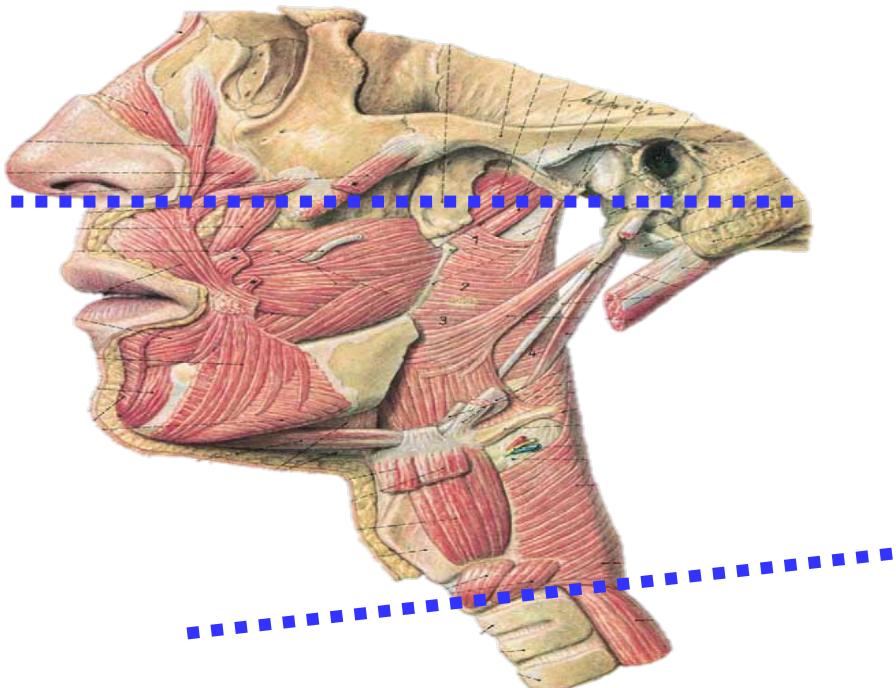
**Superiorly:**

It begins at base of the skull



**Inferiorly:**

lower border of cricoid cartilage (C6) Continues as the esophagus

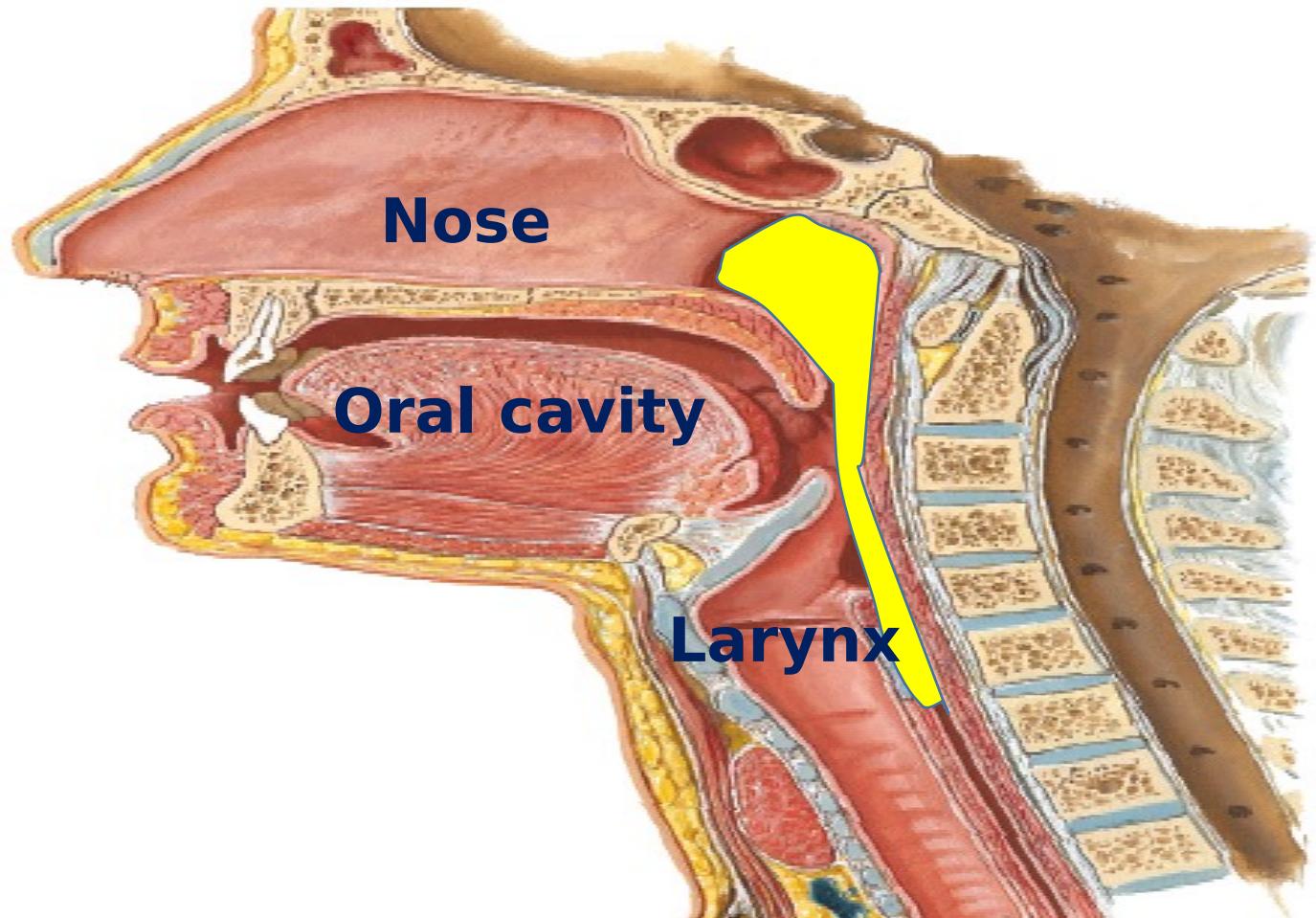


Frank H. Netter  
Atlas of Human Anatomy  
6<sup>th</sup> edition

# THE PHARYNX



- situated behind nose, mouth & larynx.
- It connects the oral and nasal cavities in the head to the larynx and esophagus in the neck.



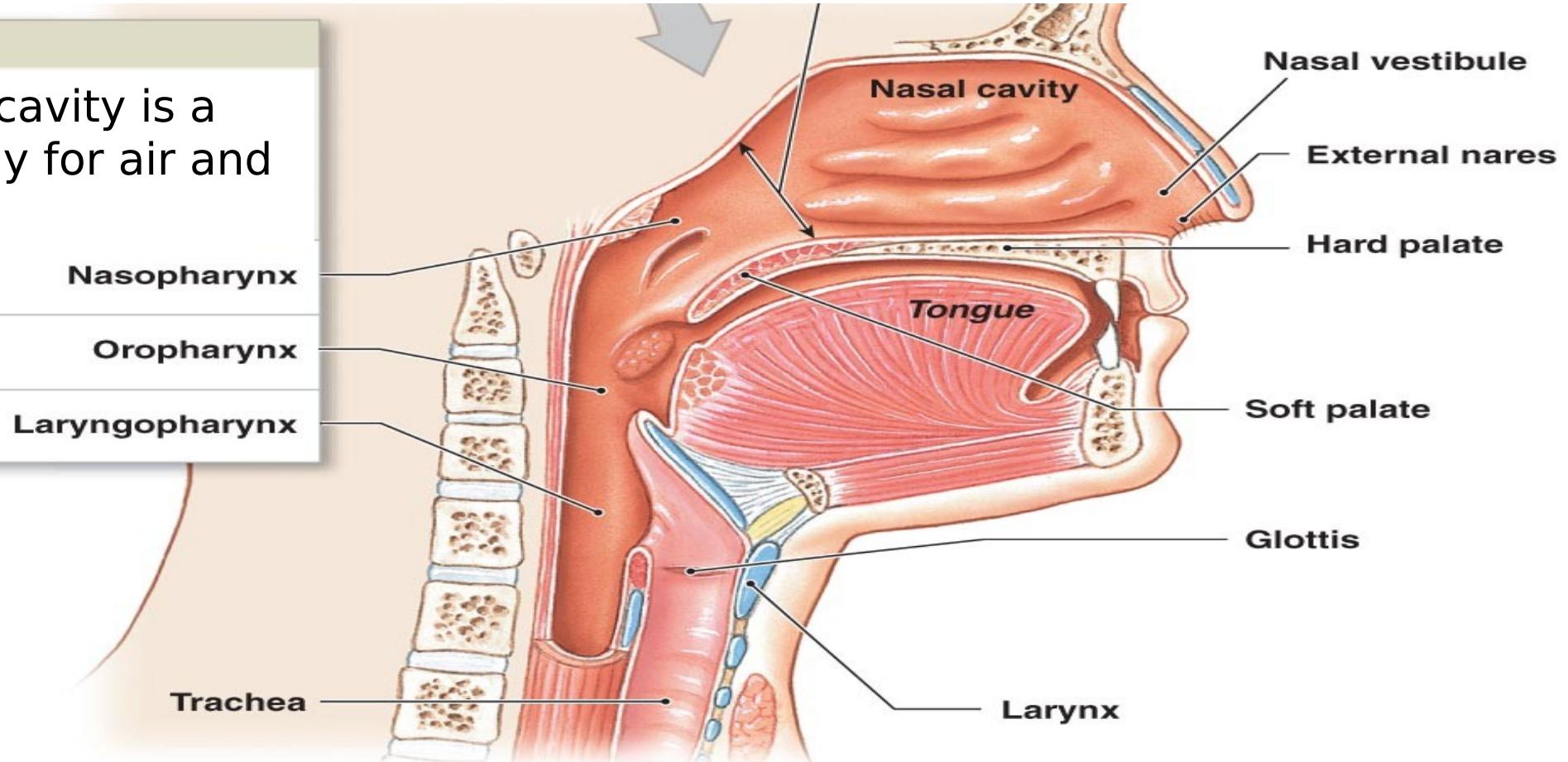
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6<sup>th</sup> edition

# THE PHARYNX



## Pharynx

- The pharyngeal cavity is a common pathway for air and food.

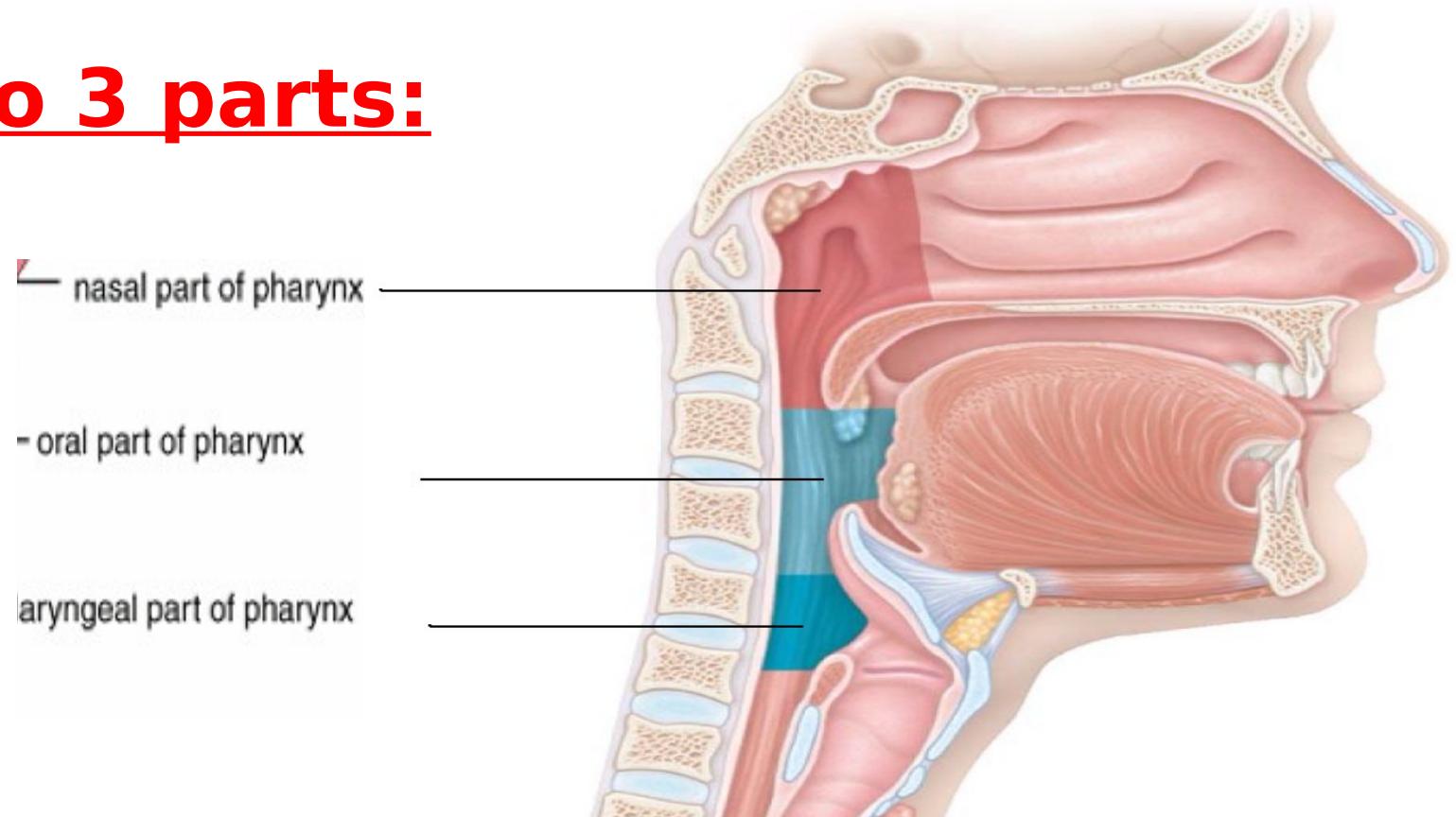


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# *Parts of the PHARYNX*

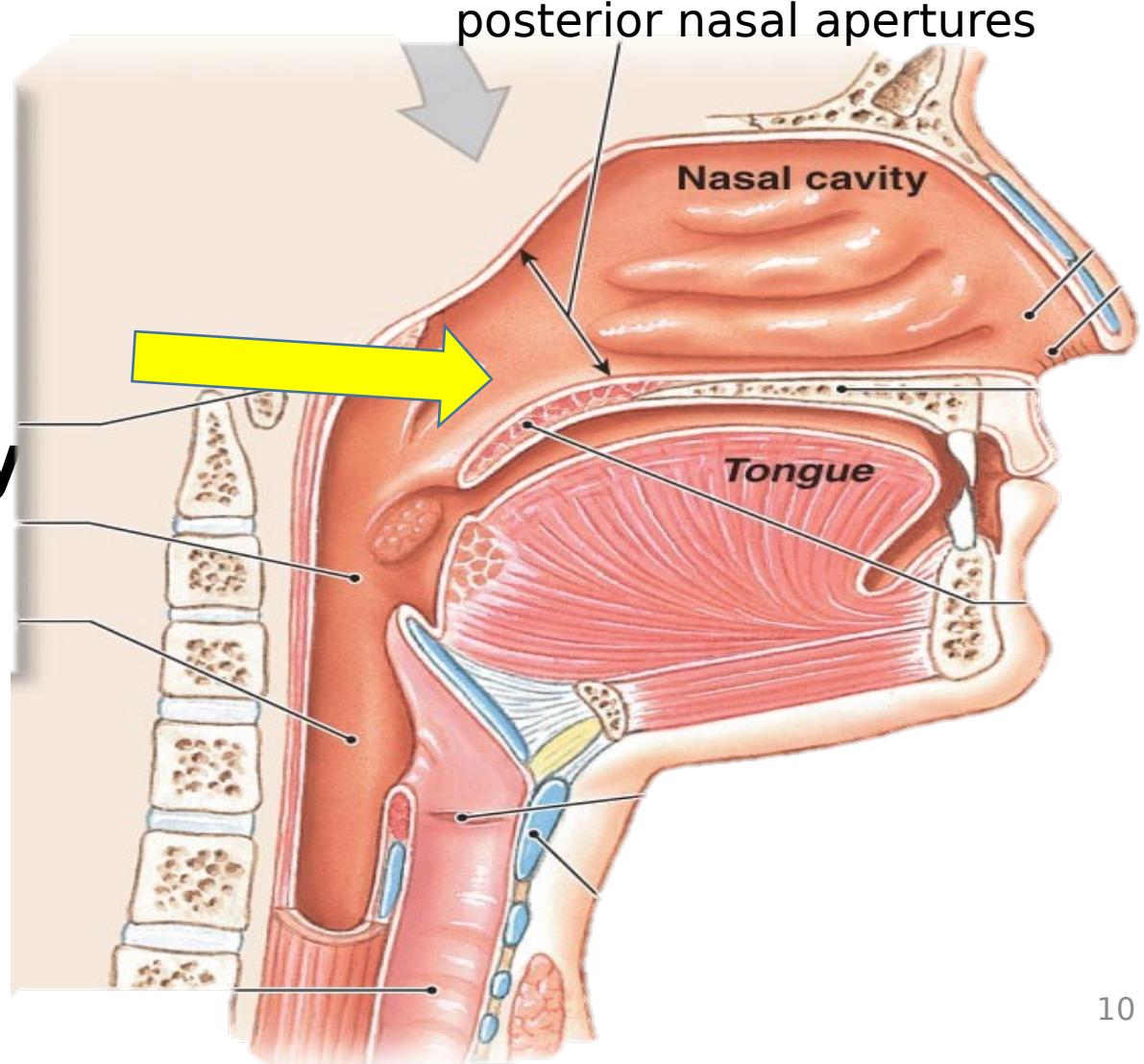
**It is divided into 3 parts:**

- 1 Nasopharynx**
- 2 Oropharynx**
- 3 Laryngopharynx**



# NASOPHARYNX

- lies behind the nasal cavities
- Its Anterior wall is missing
- Connected to the nose by the posterior nasal apertures (*choanae*).
- Its related inferiorly to **Soft palate.**



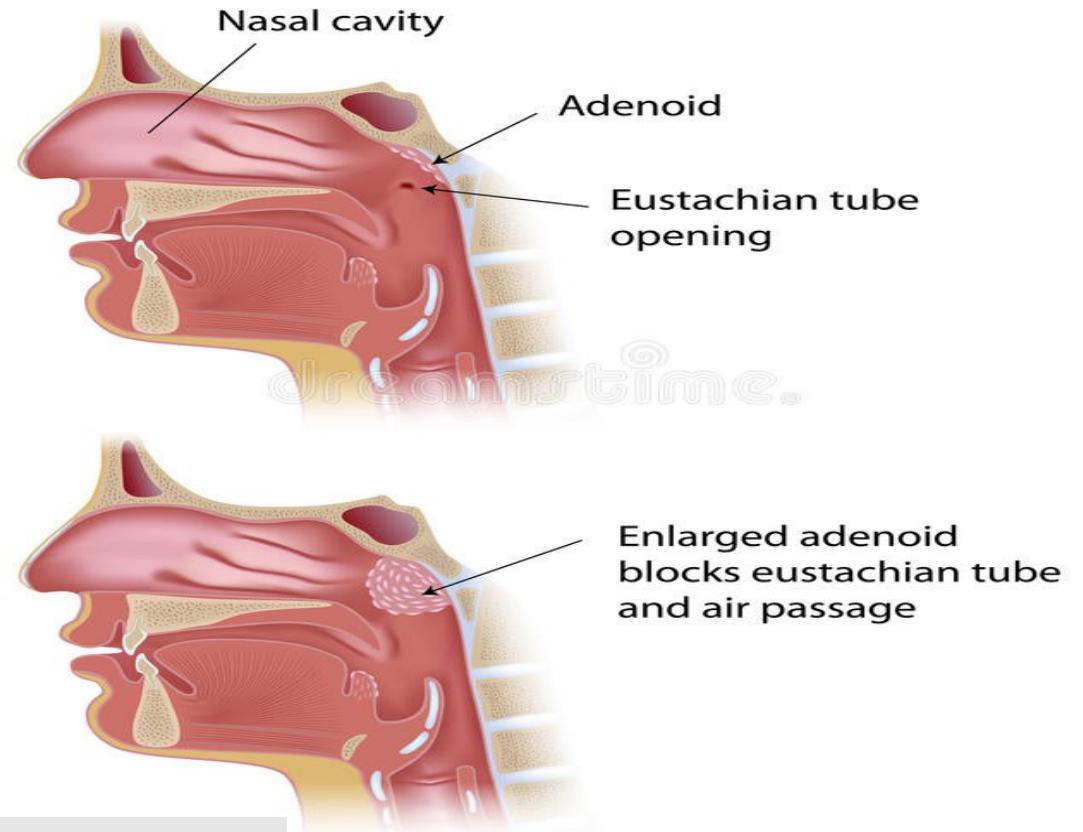
# NASOPHARYNX

**pharyngeal tonsil  
= adenoids**

- Increase in size till age :6-7 years
- Then starts to atrophy

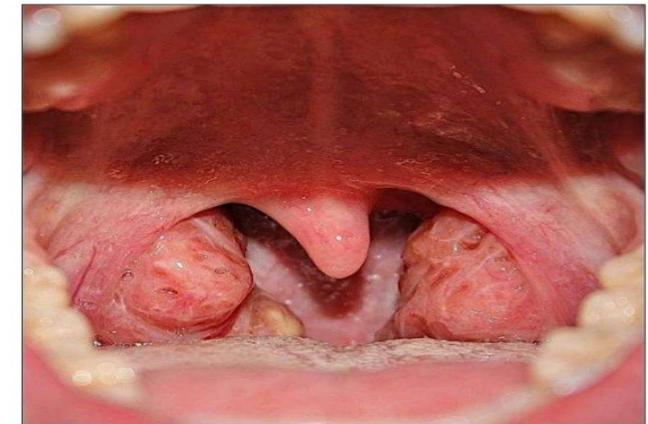
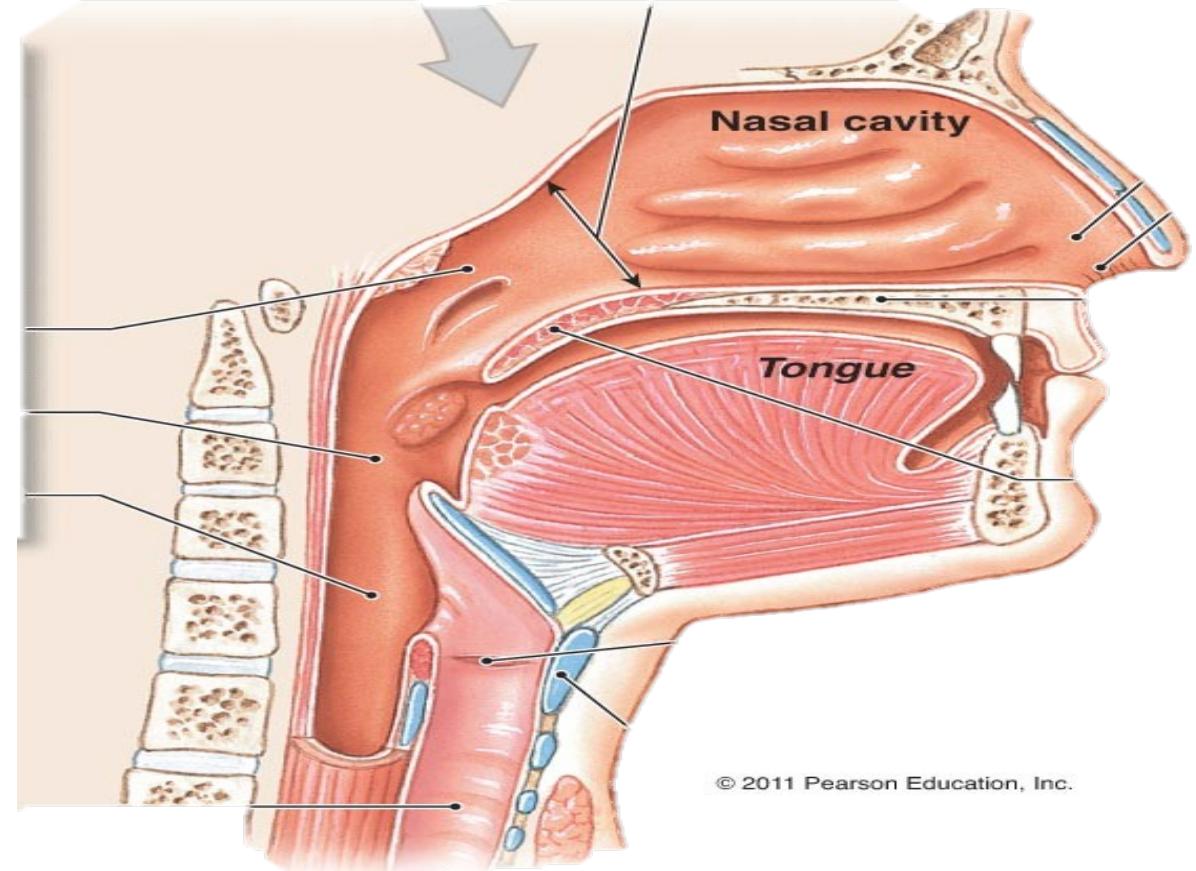
If enlarged in children it causes  
**adenoids hypertrophy**

- obstructs air flow from nose to pharynx
- child breathes through mouth



# Oropharynx

- lies behind the **oral cavity**
- with a large lymphoid mass lying in = **palatine tonsil**
- Inflamed palatine tonsil --> **tonsilitis**
- removal of the tonsil = **Tonsillectomy**

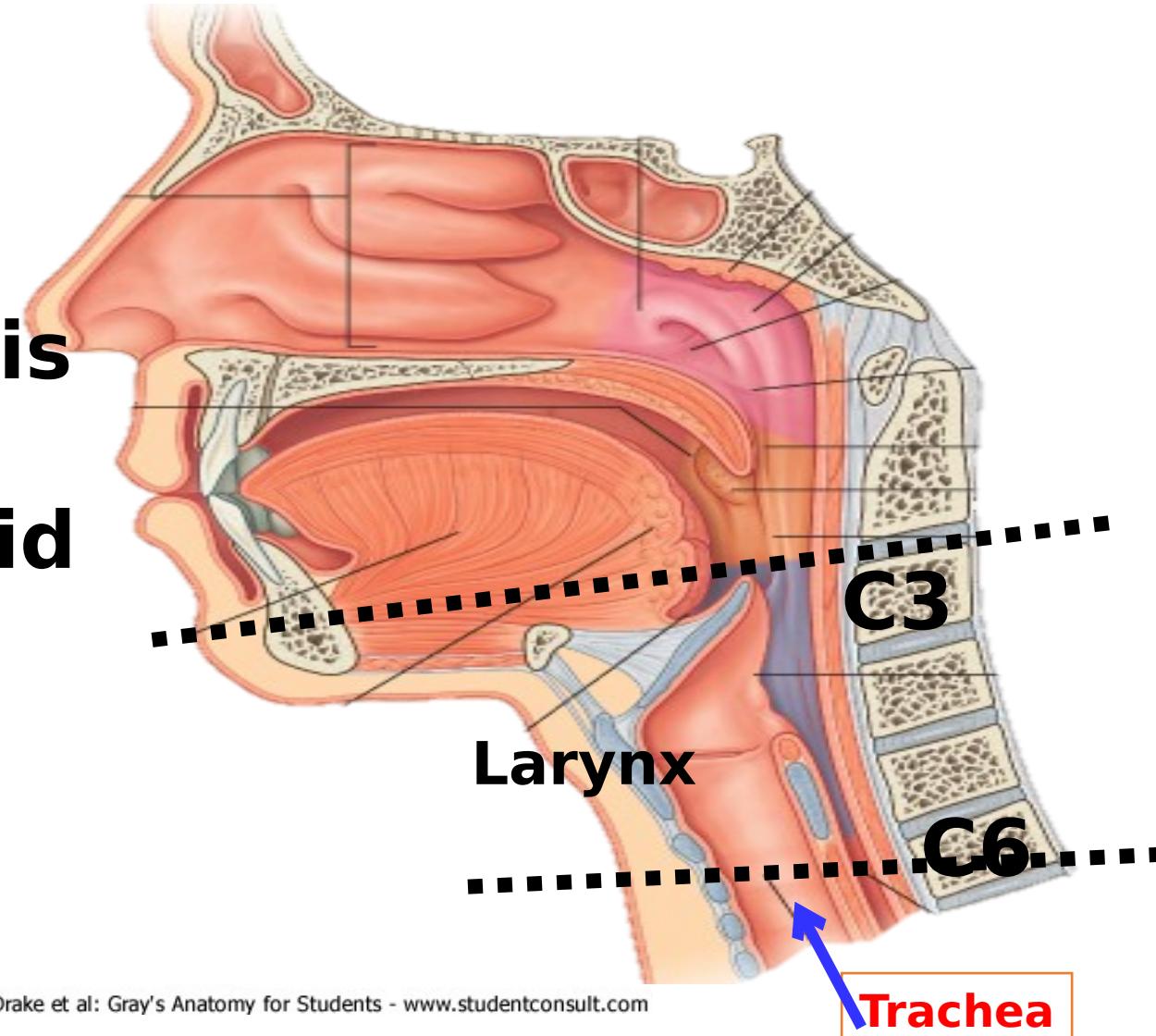


# **Larynx**

# Larynx



- Lies in midline of neck
- extending from Epiglottis (root of tongue)
- to (lower border of cricoid cartilage = C6
- where it Continues as **Trachea**



# Larynx

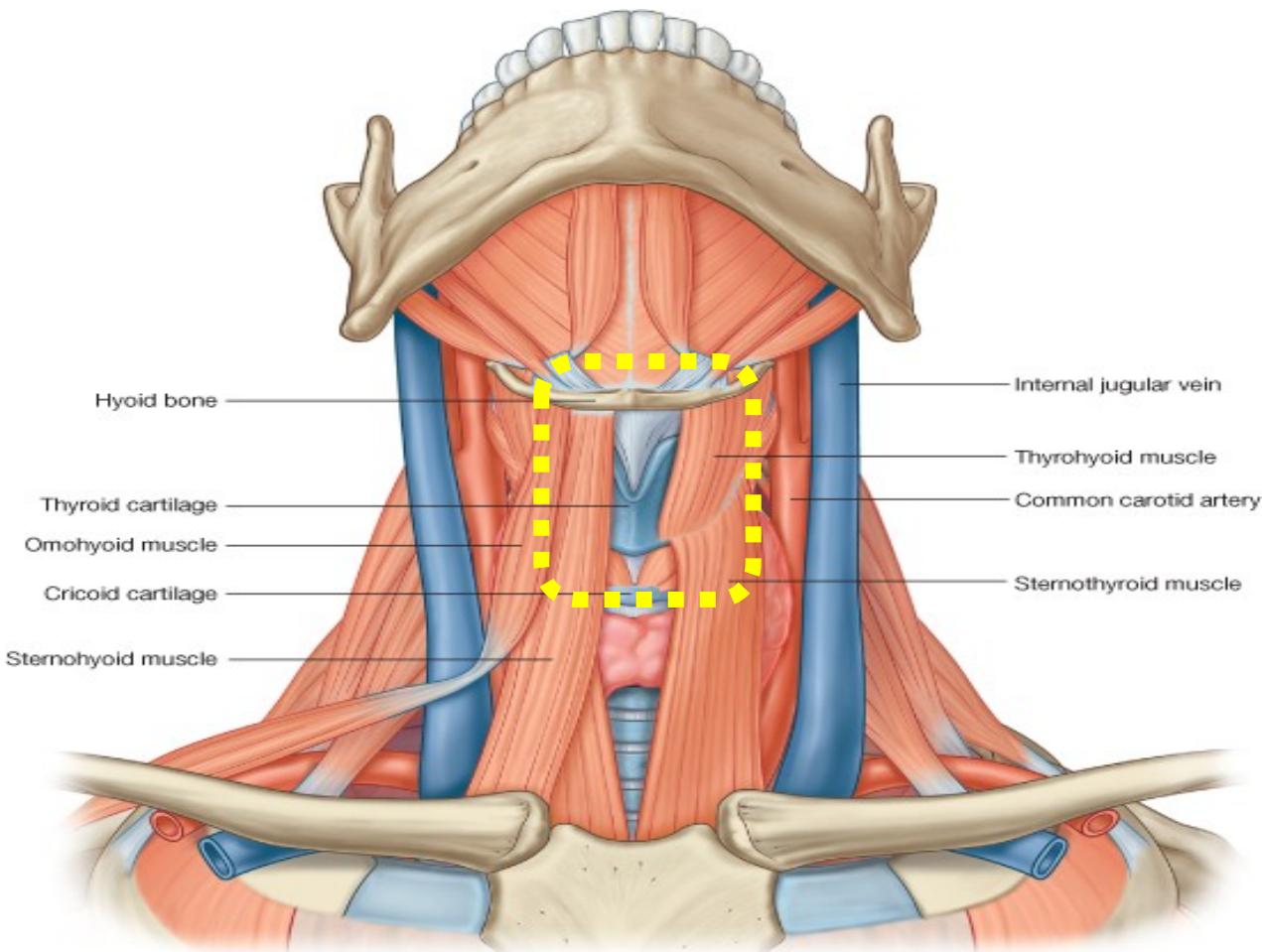
## Relations:

### **Anteriorly:**

- Skin
- Superficial fascia
- deep fascia
- infrathyroid muscles.

### **Posteriorly:**

- laryngeal pharynx
- upper part of esophagus.



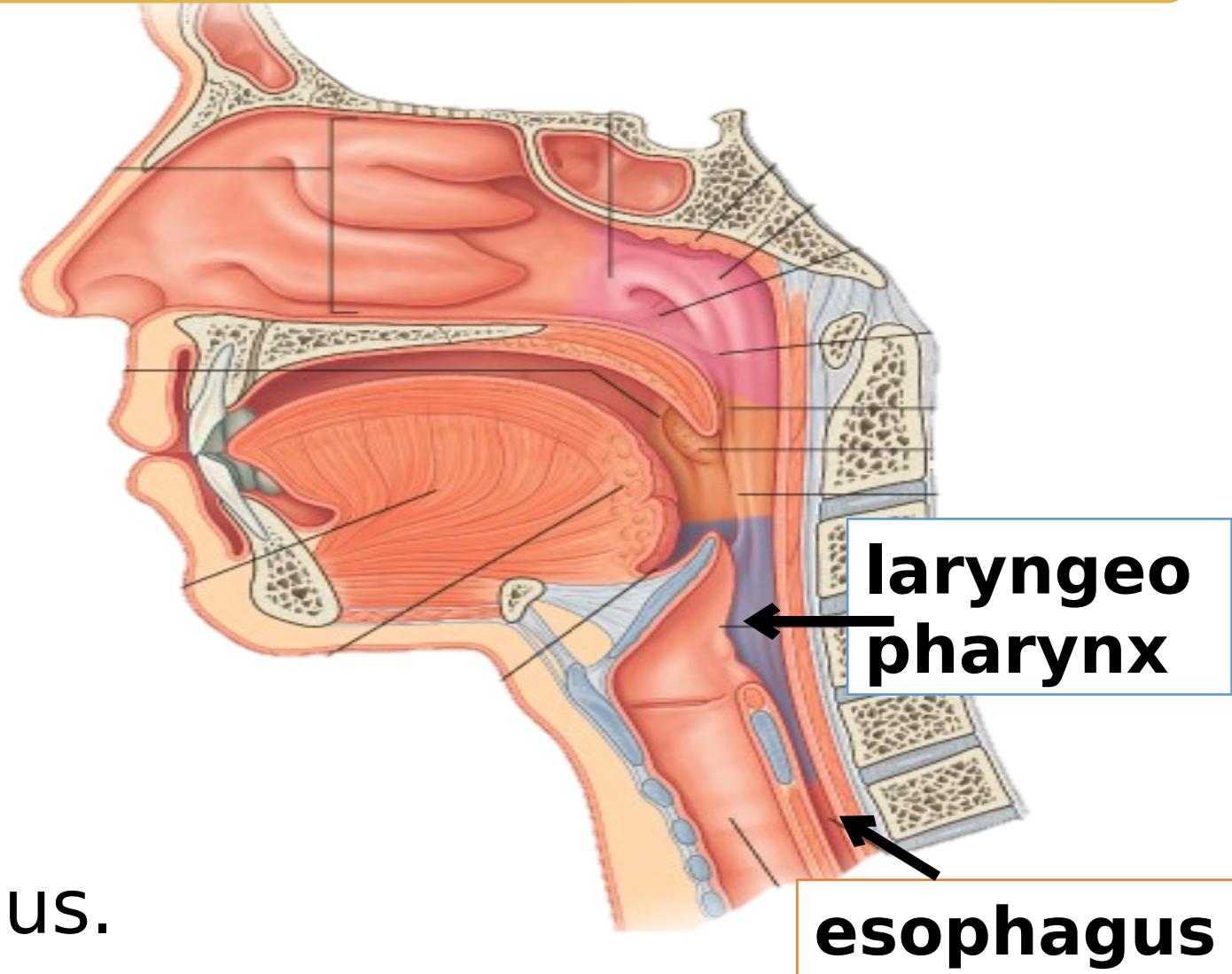
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# Larynx

## Relations:

### Anteriorly:

- Skin
- Superficial fascia
- deep fascia
- infrahyoid muscles.



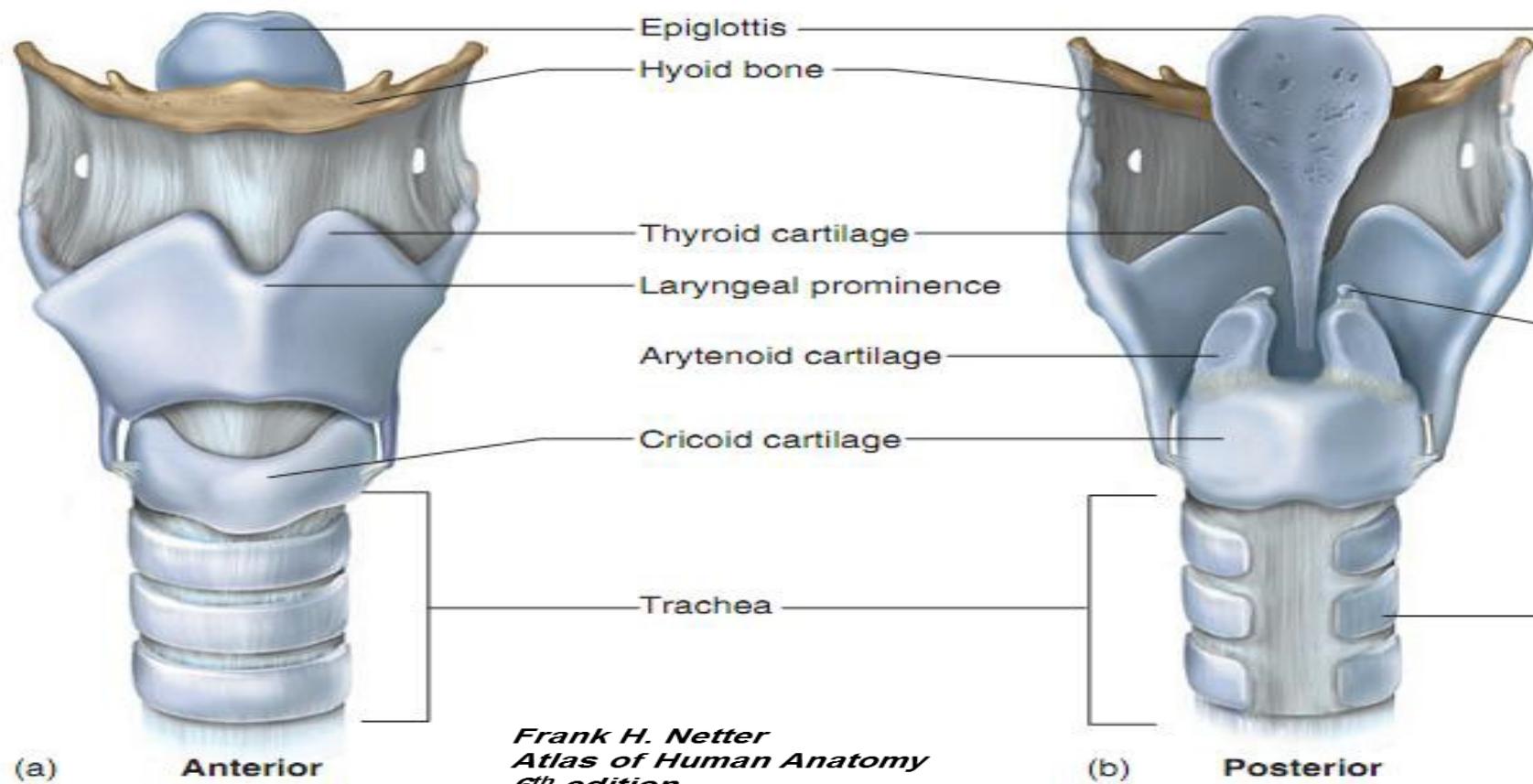
### Posteriorly:

- laryngeal pharynx
- upper part of esophagus.



# Larynx

## Cartilages of the larynx





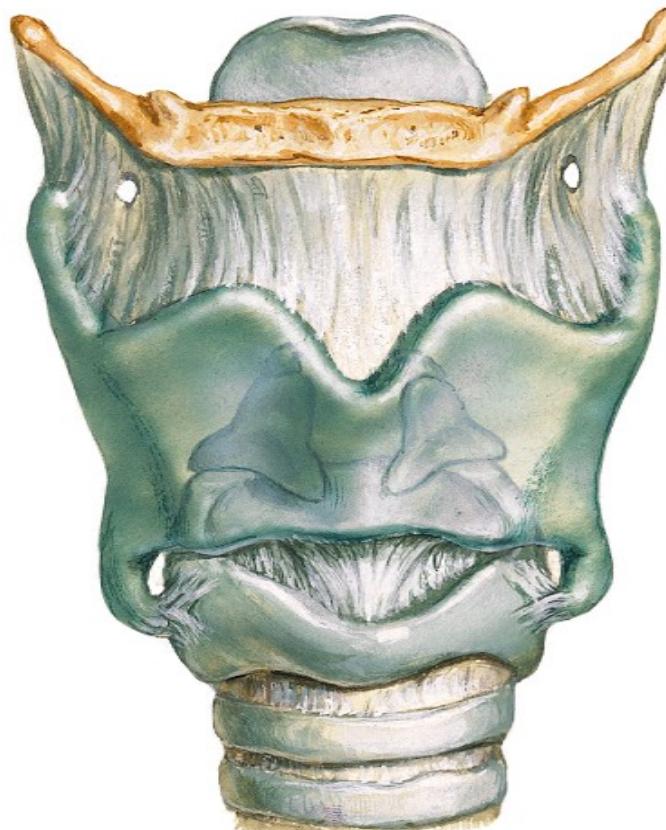
# Larynx

## Cartilages of the larynx

### Single:

3

- Epiglottis**
- Thyroid cartilage**
- cricoid cartilage**

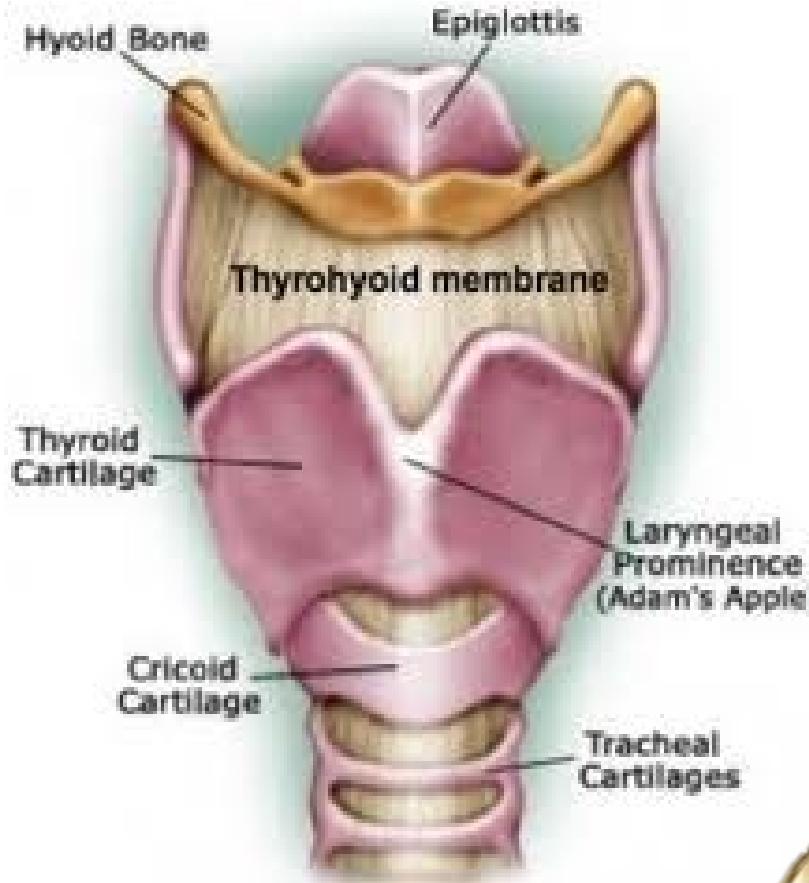


### Paired :

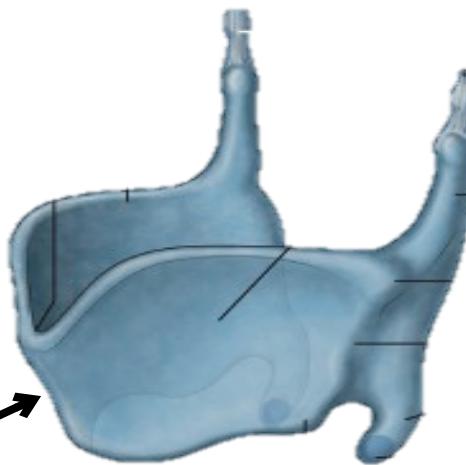
3

- Arytenoid**
- Corniculate**
- cuneiform.**

# Single Cartilages of the larynx



laryngeal  
prominence



## Thyroid Cartilage

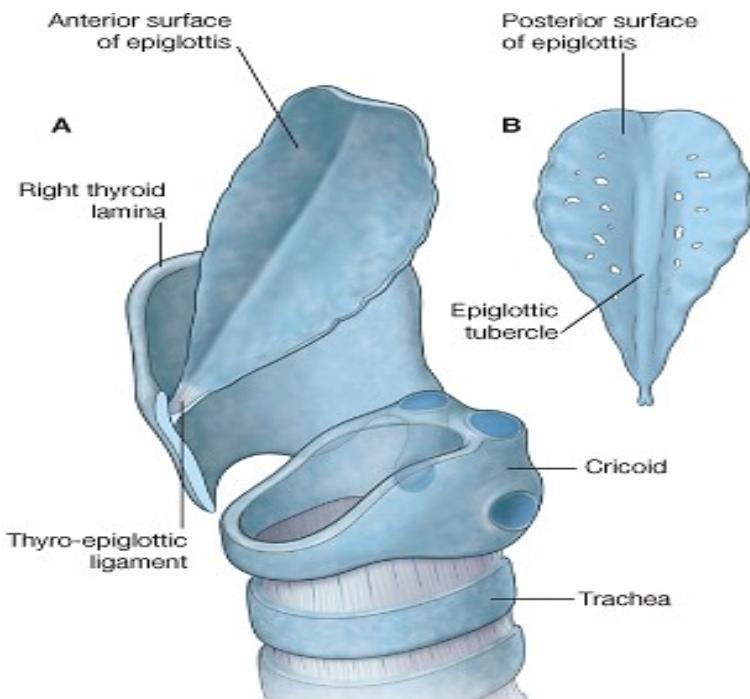


Signet **ring** shaped

## Cricoid cartilage

## Epiglottis

Leaf shaped  
midline cartilage

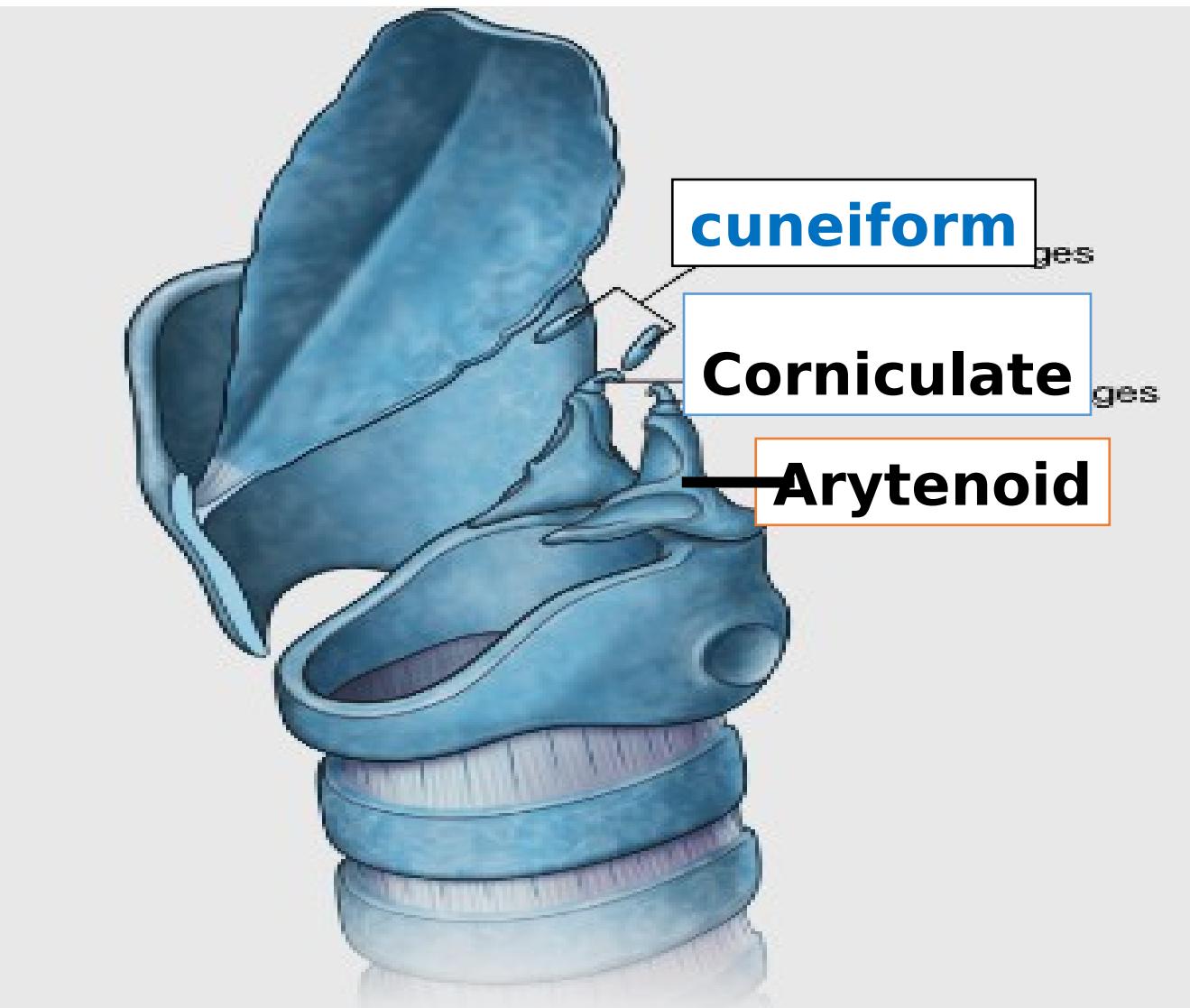


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## Paired :

3

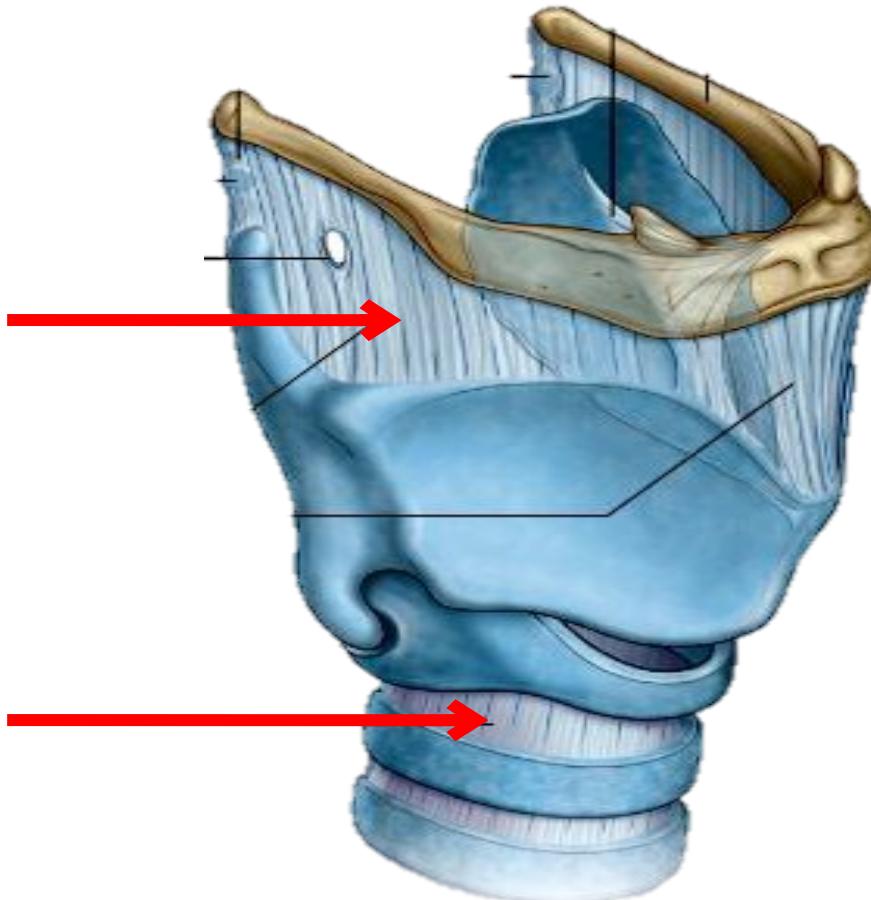
- Arytenoid
- Corniculate
- cuneiform.



# Extrinsic ligaments:

1-Thyro-hyoid  
membrane

2- Crico-  
tracheal  
ligament



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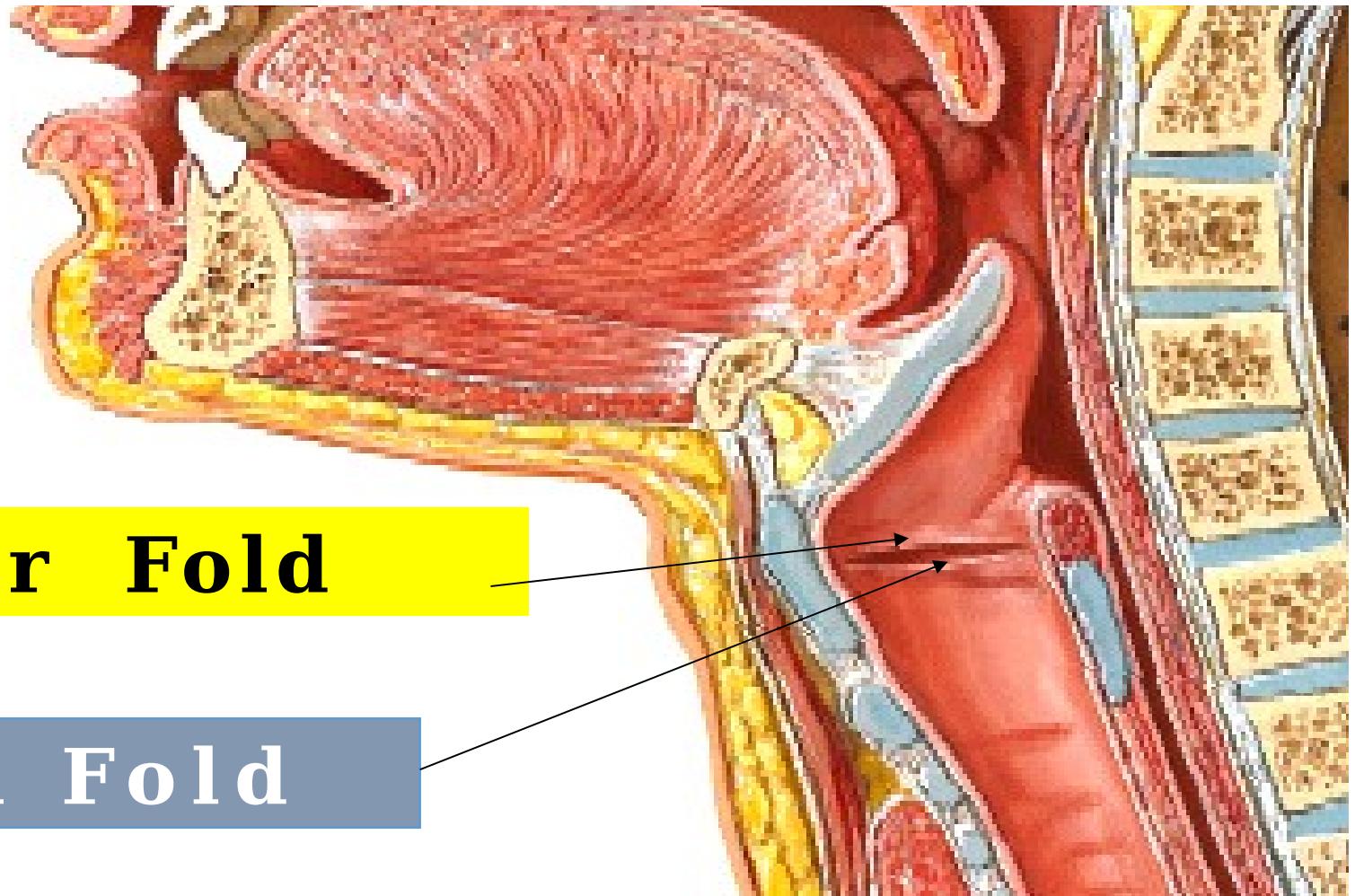
# Intrinsic ligaments:

**False  
vocal  
folds**

**Vestibular Fold**

**True  
vocal  
folds**

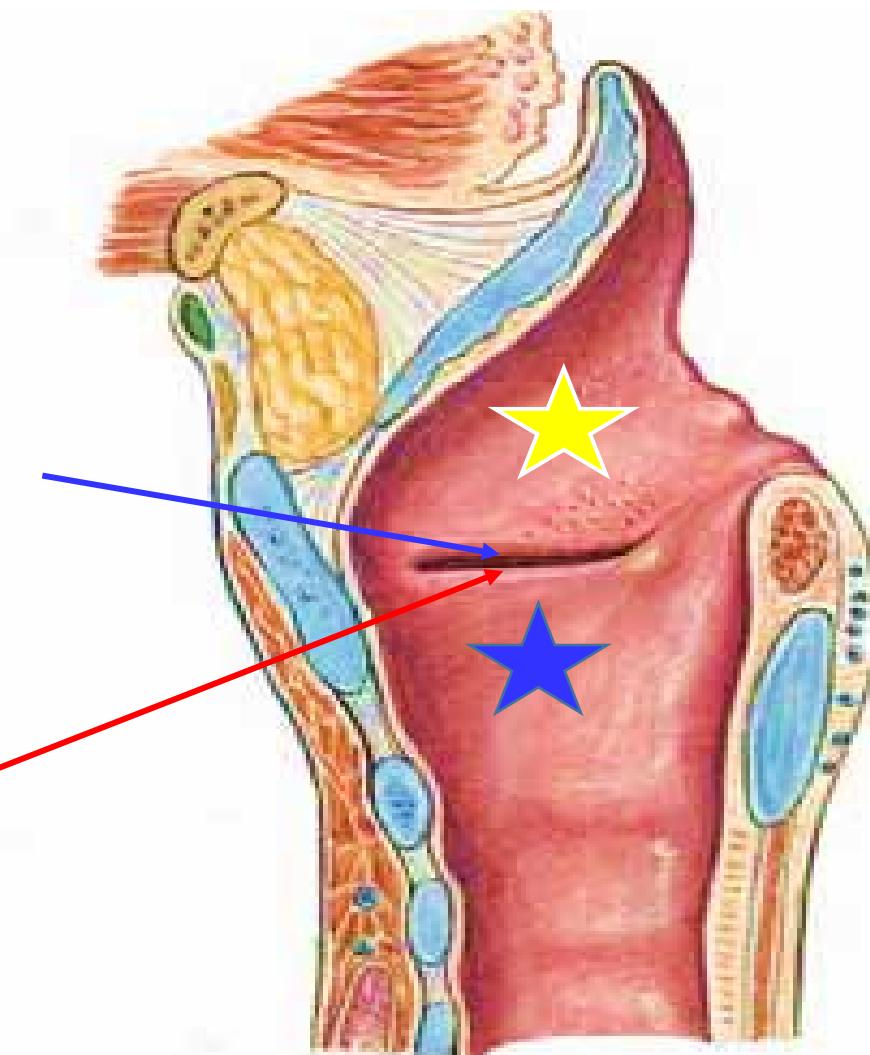
**Vocal Fold**



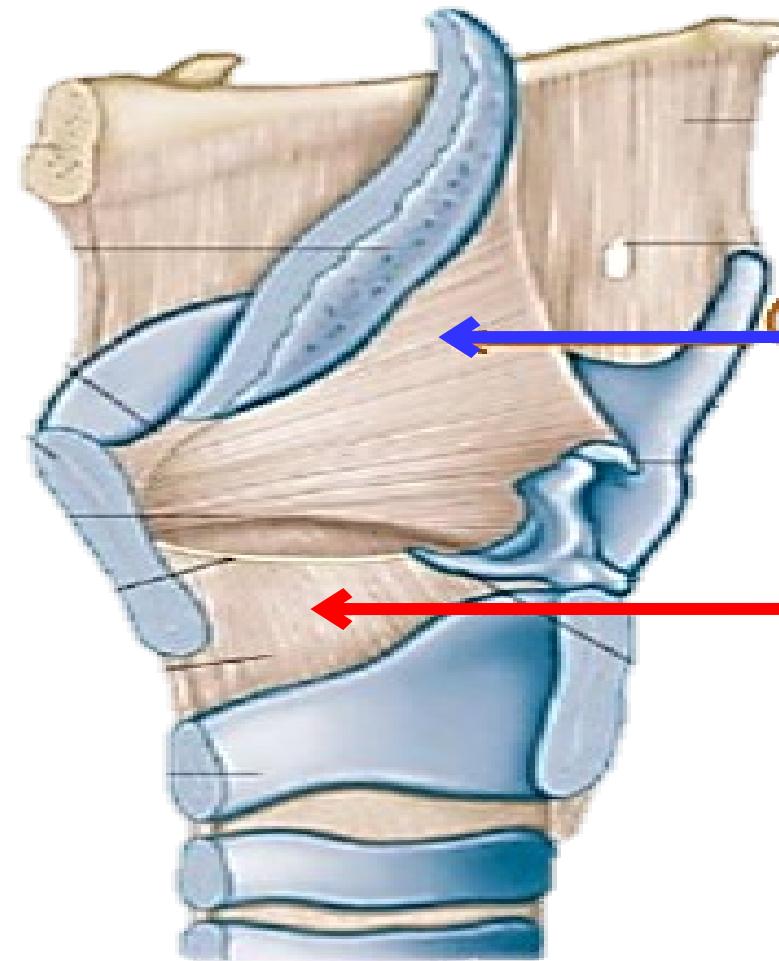
Frank H. Netter  
Atlas of Human Anatomy  
6<sup>th</sup> edition



# Intrinsic ligaments:



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Atlas of Human Anatomy  
6th edition

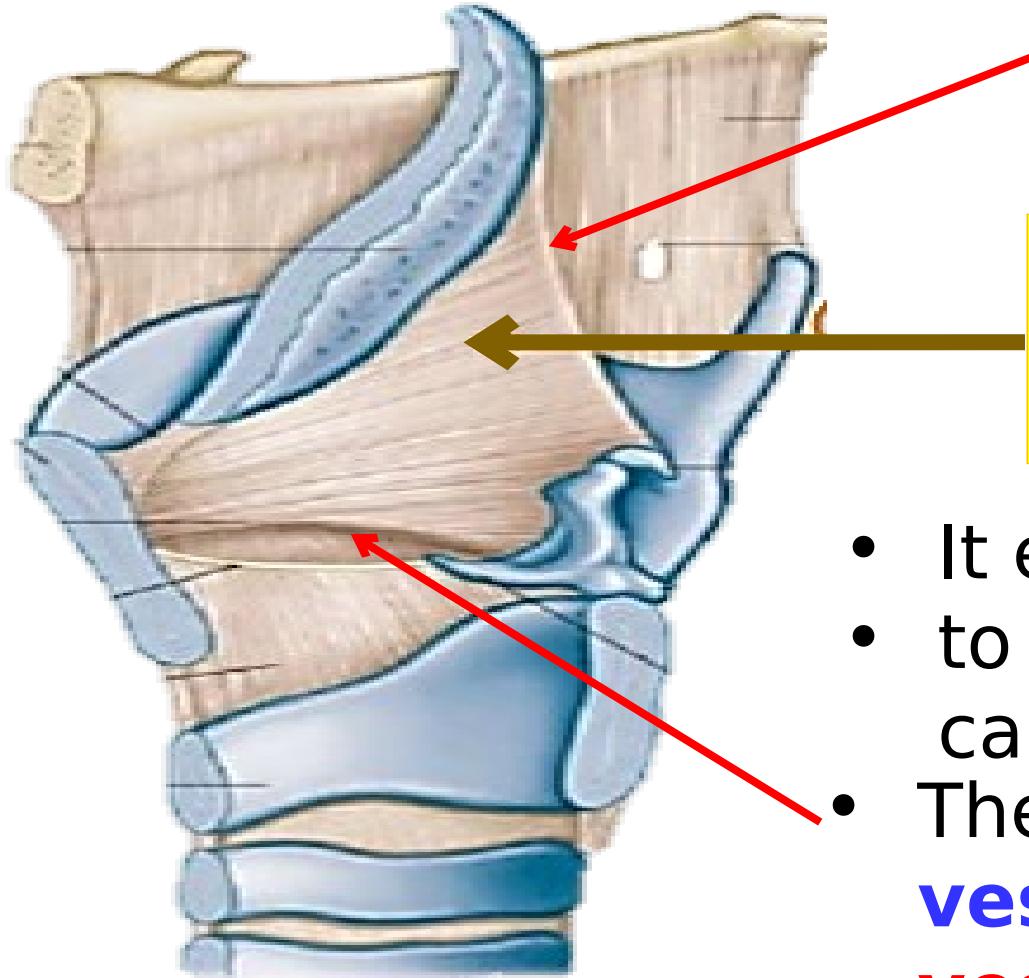


**Quadrangular  
membrane**

**Cricothyroid  
membrane**



# Intrinsic ligaments:



- The free upper margin form **Aryepiglottic fold**

## quadrangular membrane

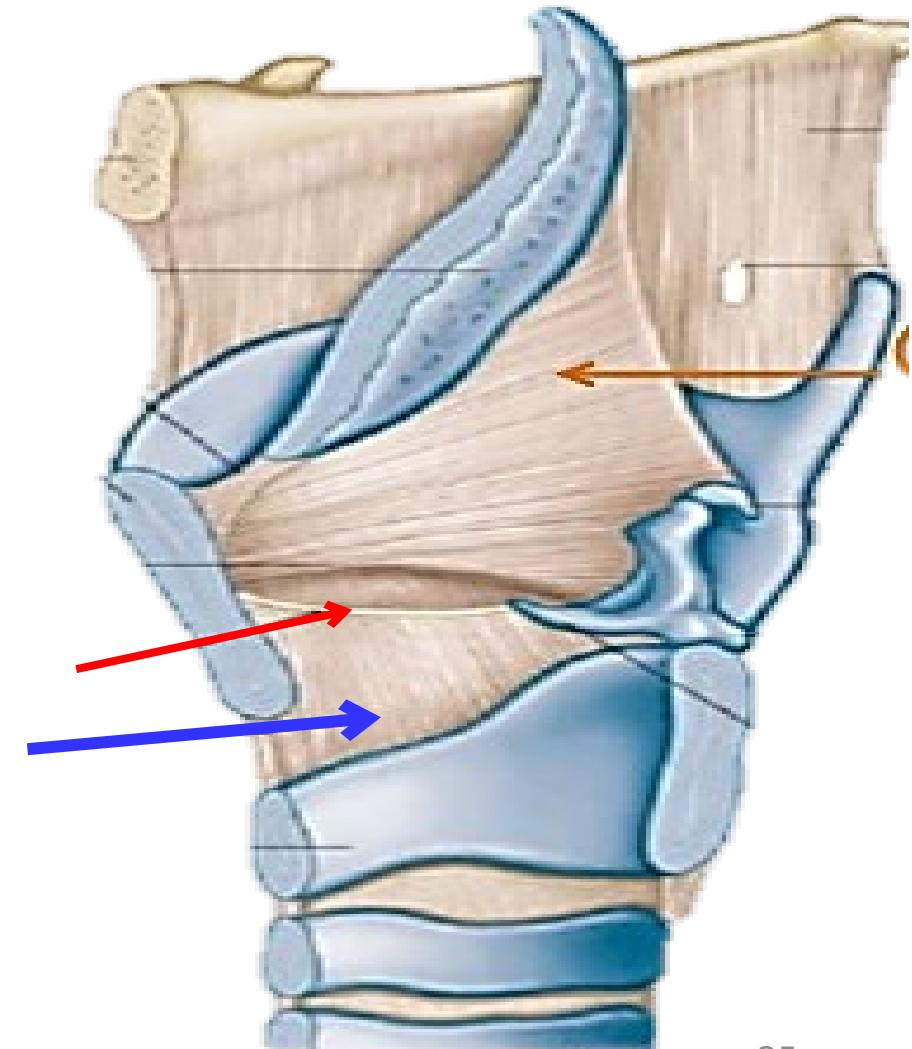
- It extends between **epiglottis**
- to **arytenoid** and **corniculate** cartilage on the same side
- The free lower margin form the **vestibular ligament** under the **vestibular fold** (**false vocal cord**).

# Intrinsic ligaments:

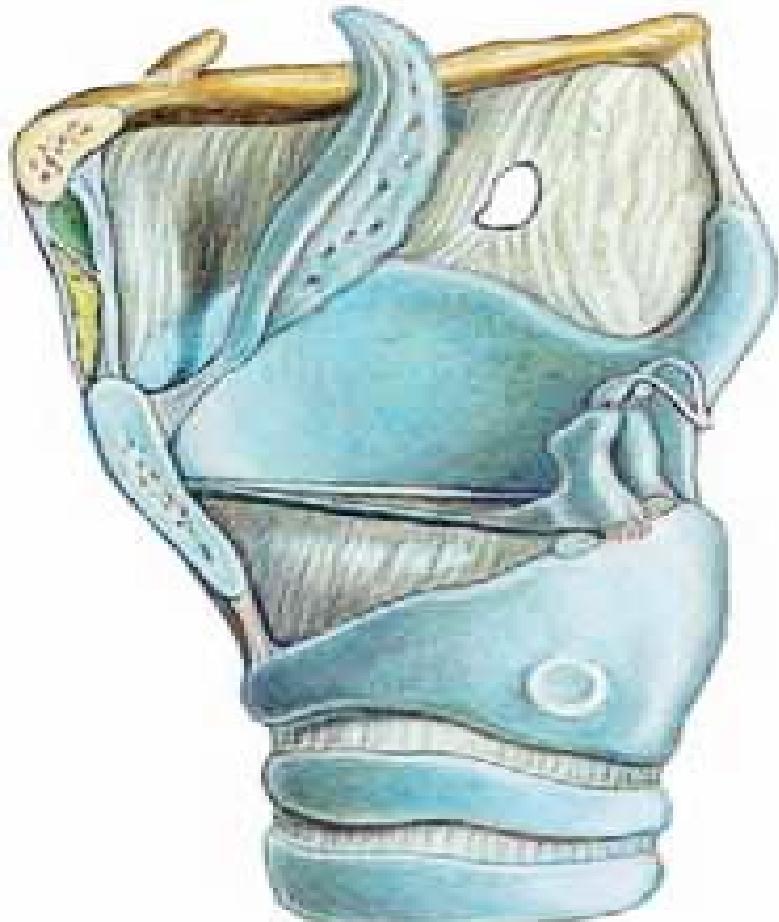


## CricoThyroid Ligament

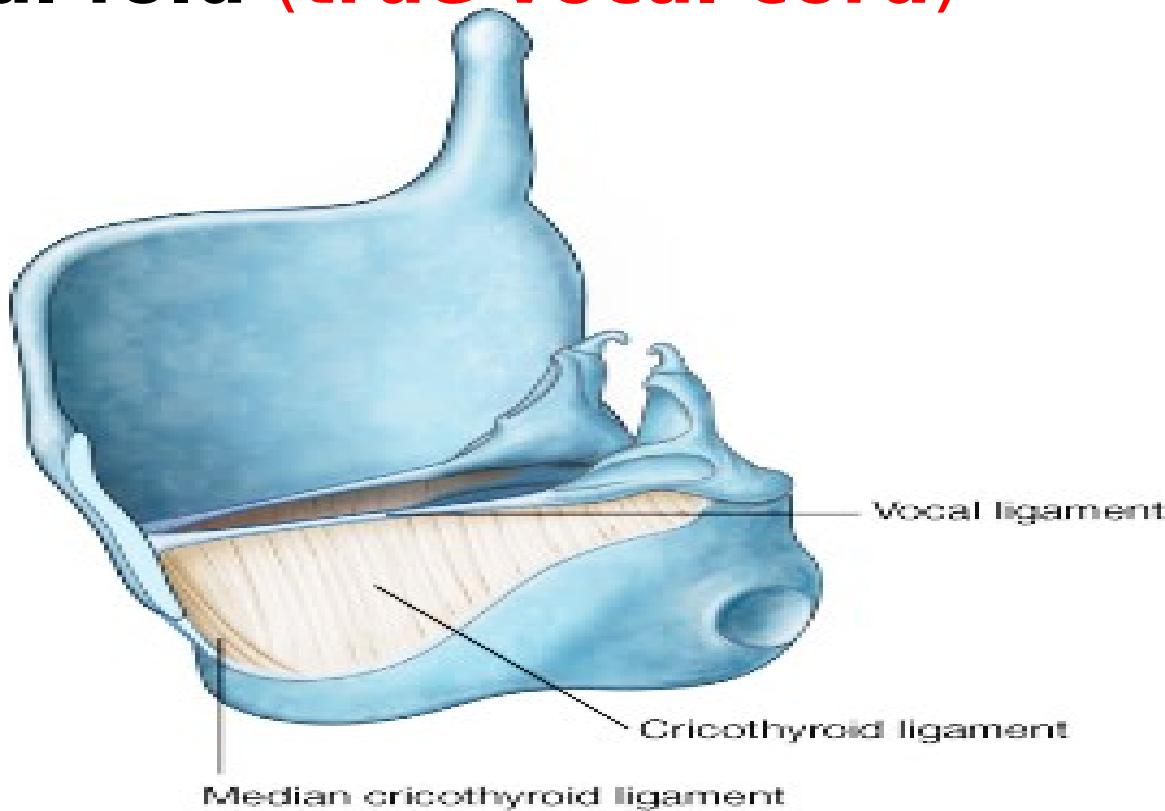
- It has a ***free upper margin*** which form
  - **vocal fold (true vocal cord)**
- It is attached to **arch of cricoid cartilage**
- **Extented between *thyroid cartilage and arytenoid cartilages (vocal processes)***



# Intrinsic ligaments:



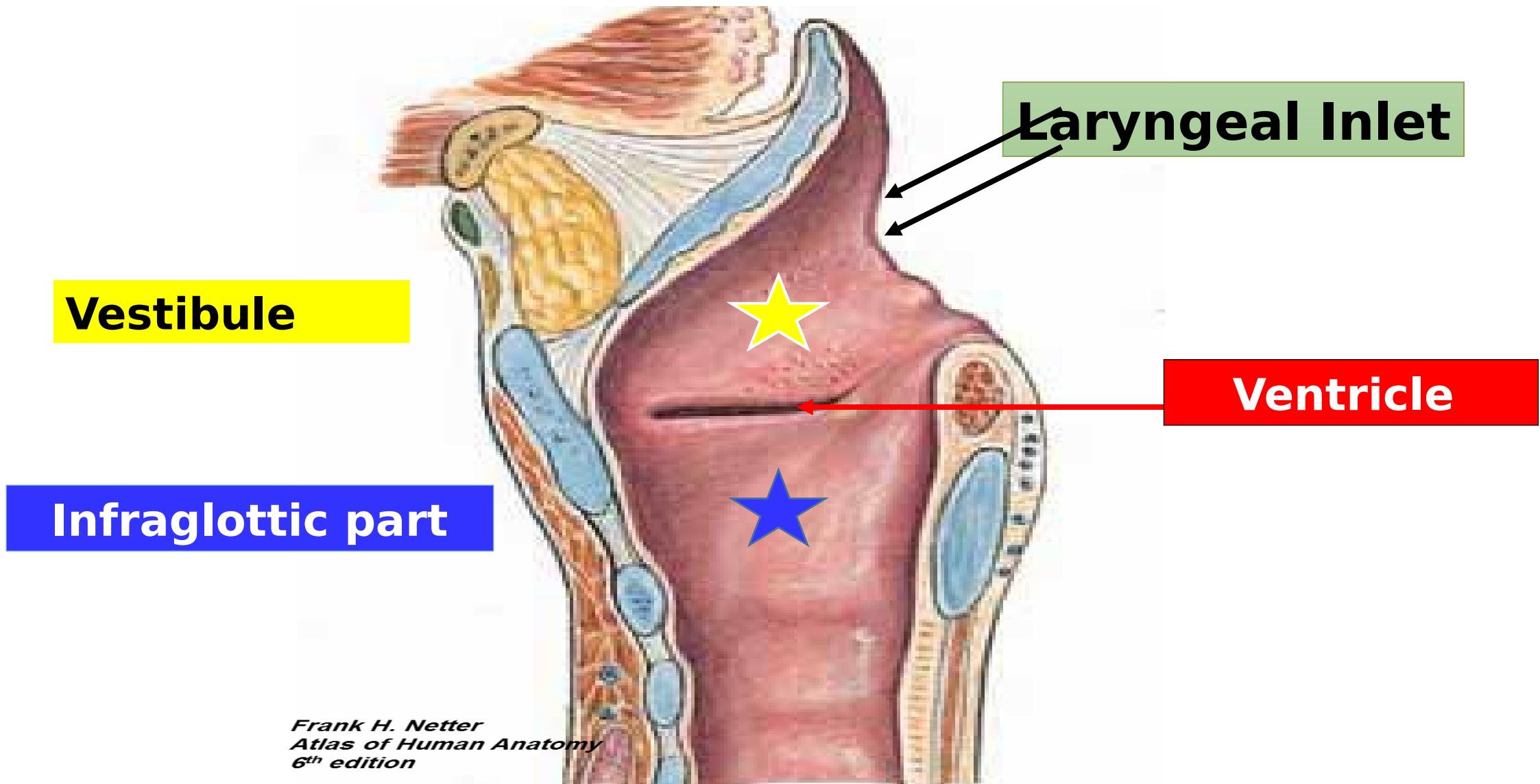
□ **CricoThyroid Ligament**  
*free upper margin* form □  
**vocal fold (true vocal cord)**



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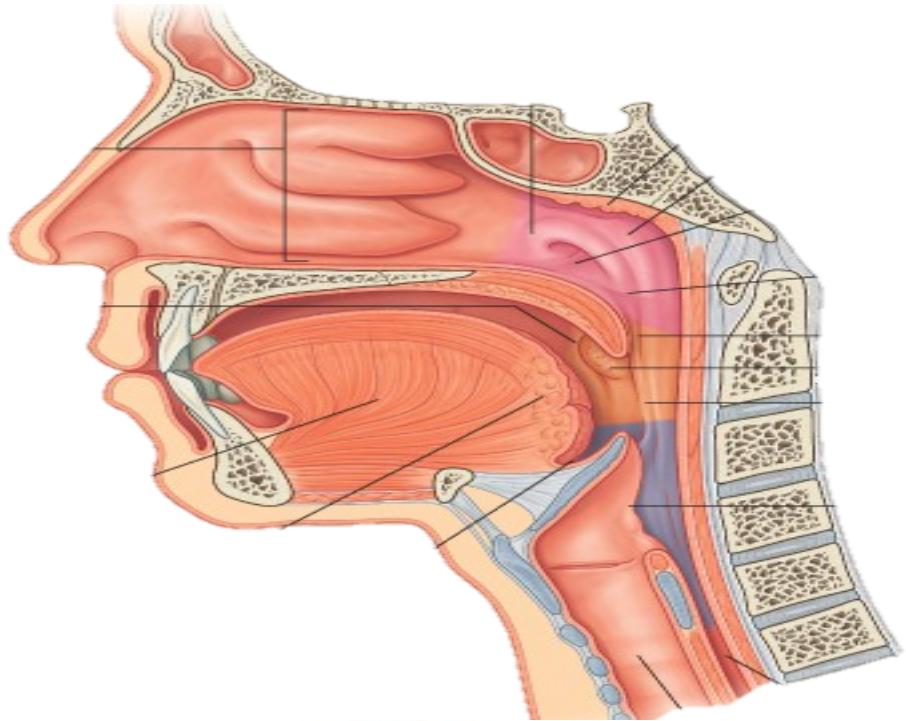


# Intrinsic features :

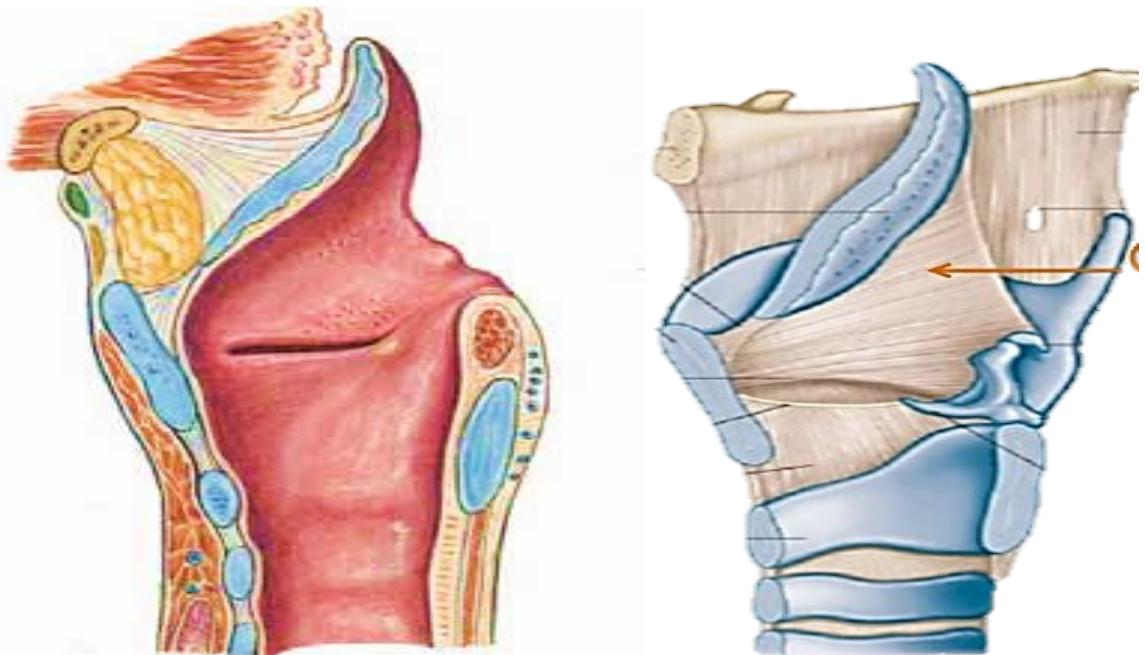


## Laryngeal Inlet:

- it is **the superior aperture**
- below and posterior to the **tongue**
- Anterior to **pharynx**
- **anterior border** → **epiglottis**;
- **lateral borders** →  
**(aryepiglottic folds)**
- **posterior border** →  
mucosal fold between the two  
corniculate tubercles



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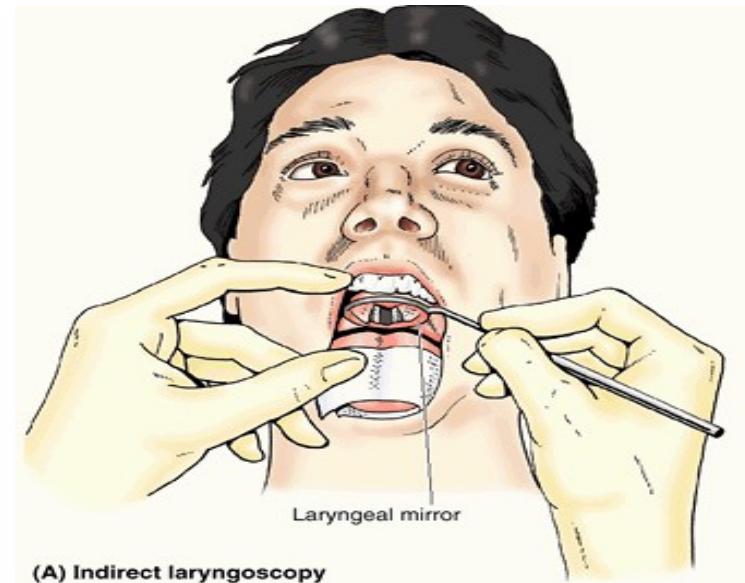


Inspection of the vocal folds (cords)

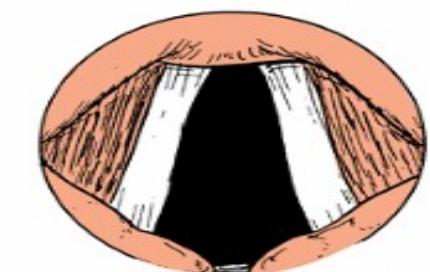
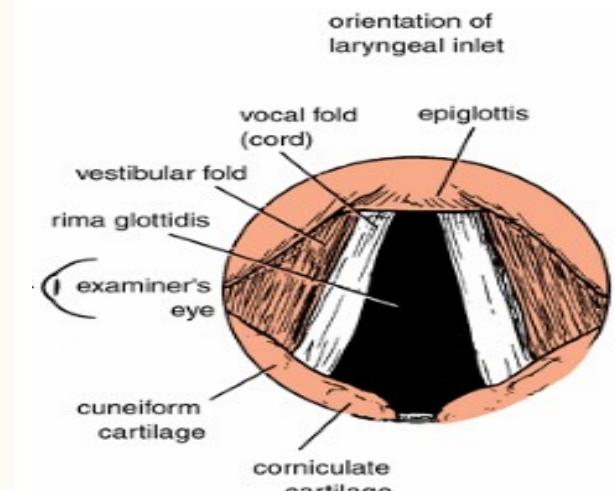
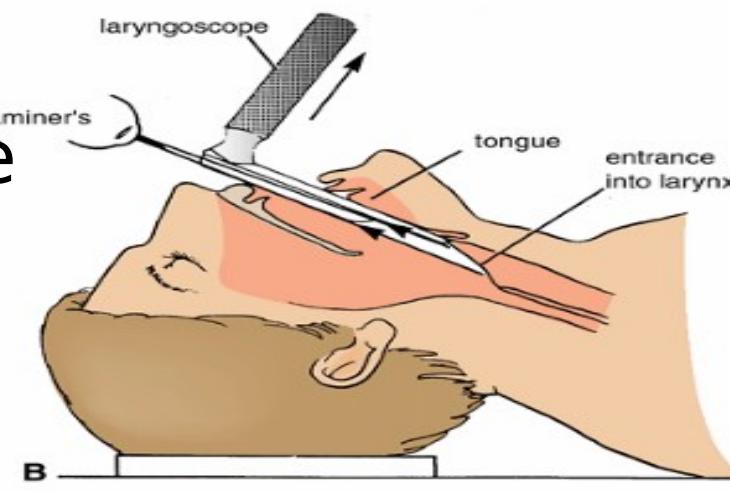
**(A) indirectly through a laryngeal mirror**

**(B) through a laryngoscope**

Note the orientation of the structures forming the laryngeal inlet.



(A) Indirect laryngoscopy

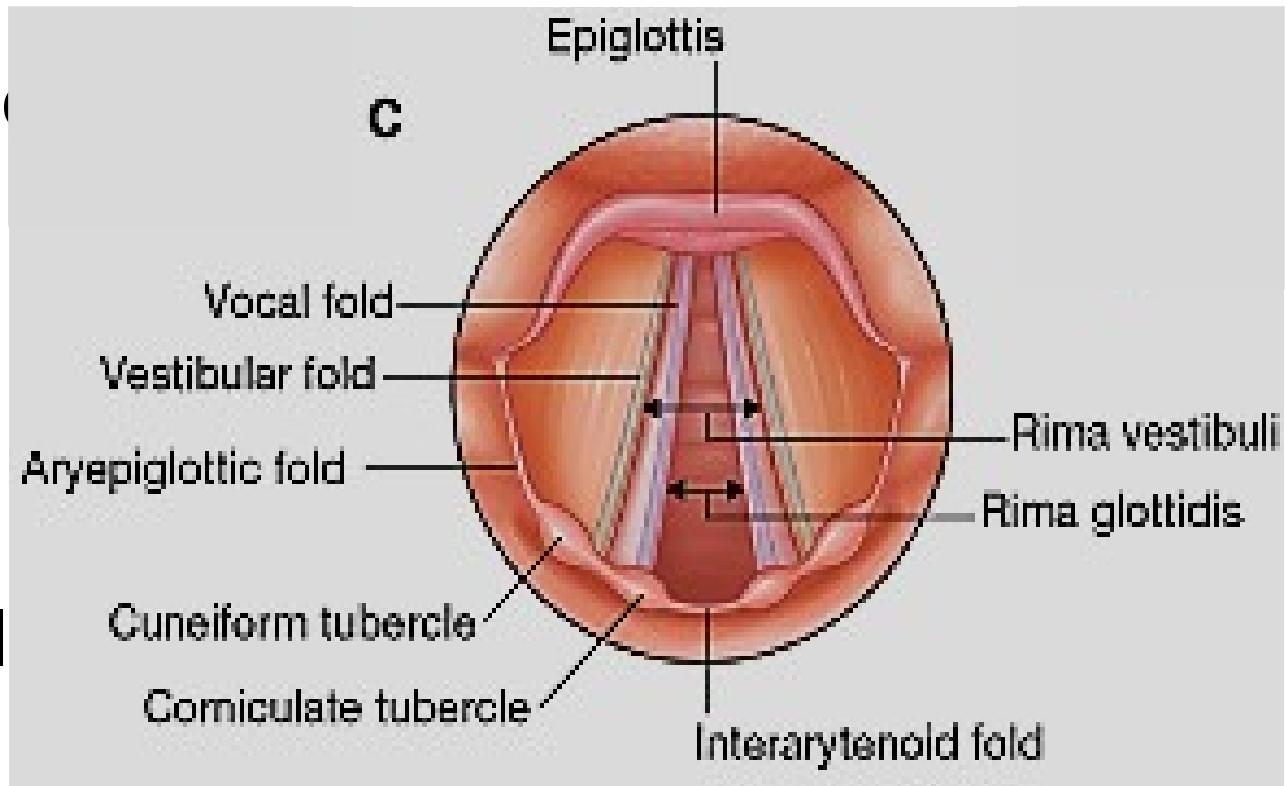


## **The Rima Vestibuli:**

it is a triangular-shaped opening between the two adjacent vestibular folds

## **The Rima Glottidis**

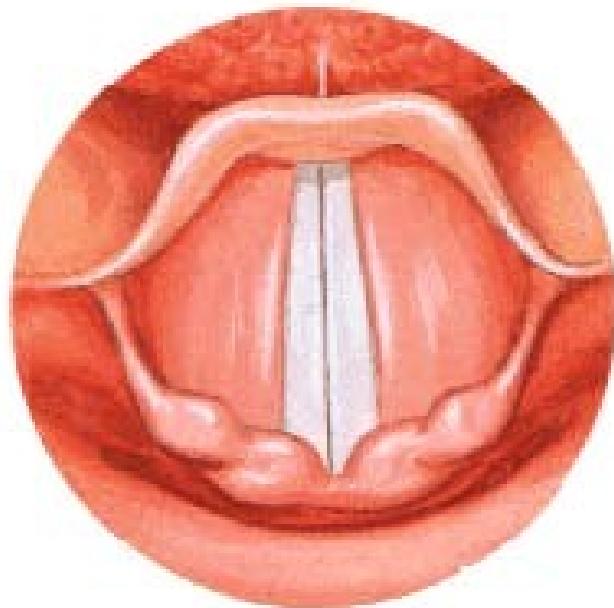
it is a narrower triangular opening between the two vocal folds.



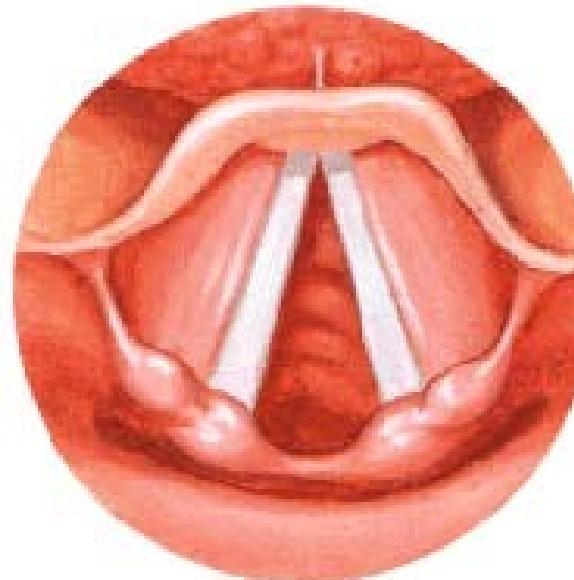
*Clinical Anatomy for Medical Students .Richard S. Snell*

# Movements of the Vocal Cords

- Adduction
- Abduction

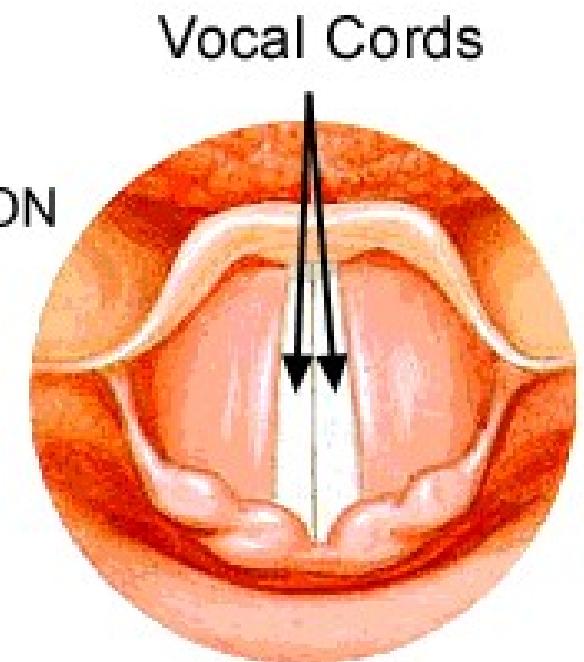


Folds closed (adducted)



Folds open (abducted)

PHONATION



Glottis (space  
between folds)

*Clinical Anatomy for Medical Students .Richard Snell*

# MUSCLES OF THE LARYNX

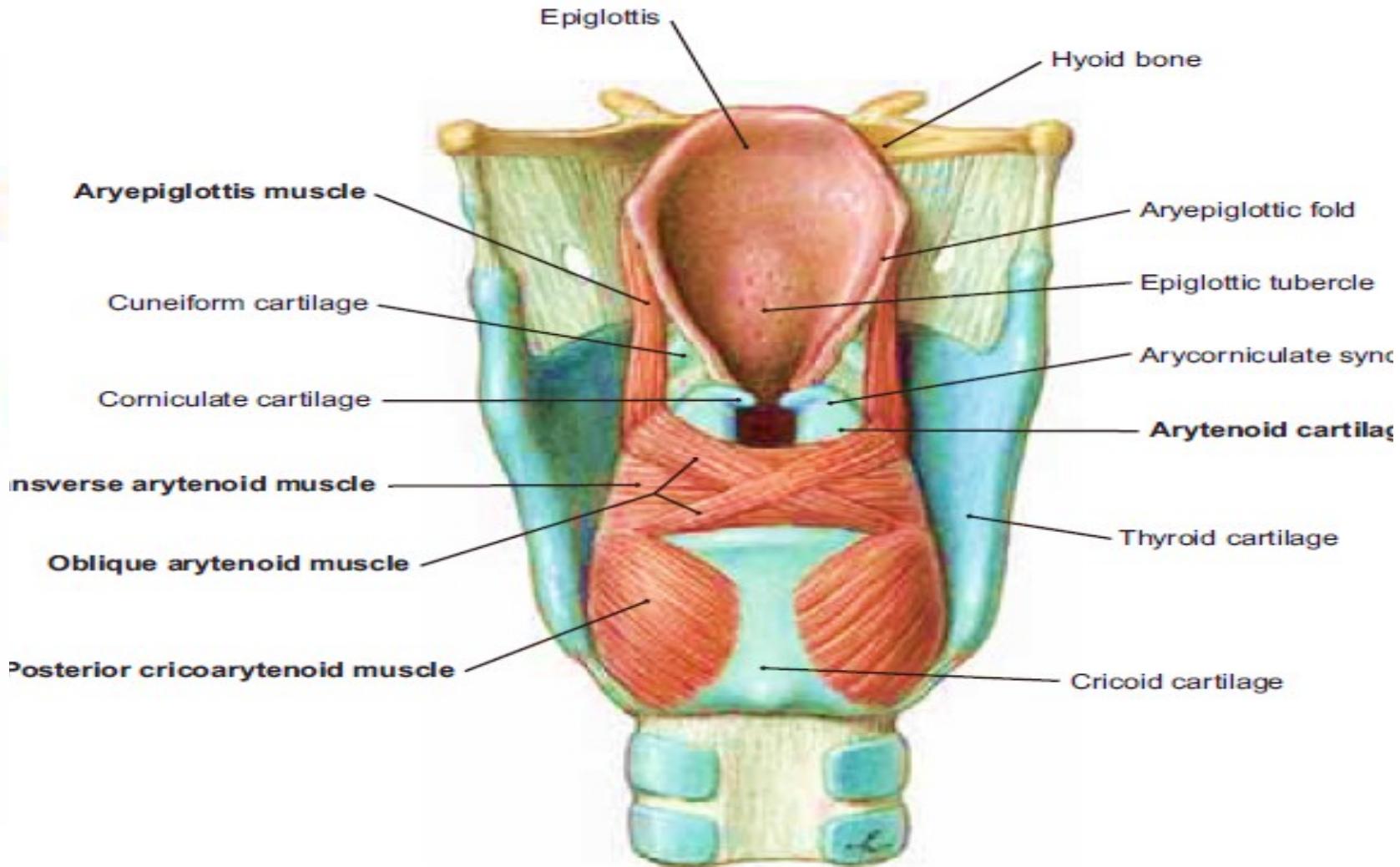


***They connect different cartilages together***

**Their actions are :**

1. adjust tension in the vocal ligaments,
2. open and close the rima glottidis,
3. control dimensions of the vestibule,
4. facilitate closing of the laryngeal inlet.

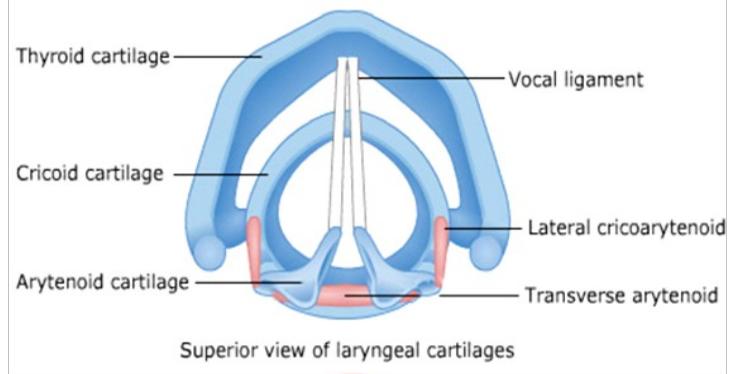
# MUSCLES OF THE LARYNX



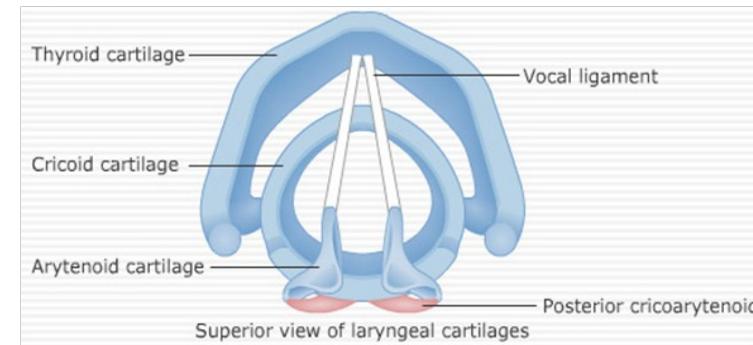
# MOVEMENTS OF MUSCLES OF THE LARYNX



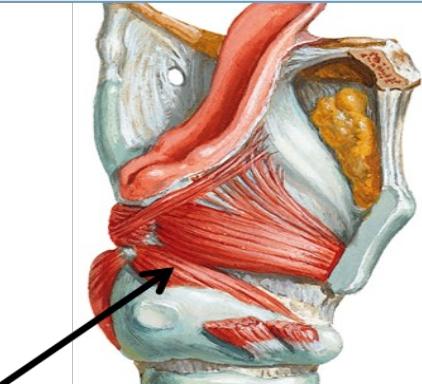
## Adductors



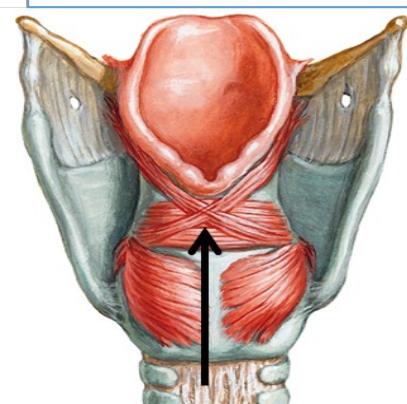
## Abductor



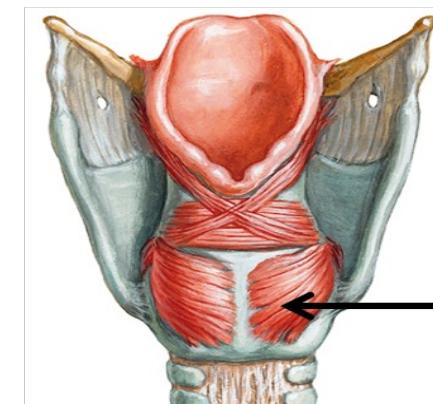
### Lateral crico-arytenoid



### Transverse arytenoid



### posterior crico-arytenoid



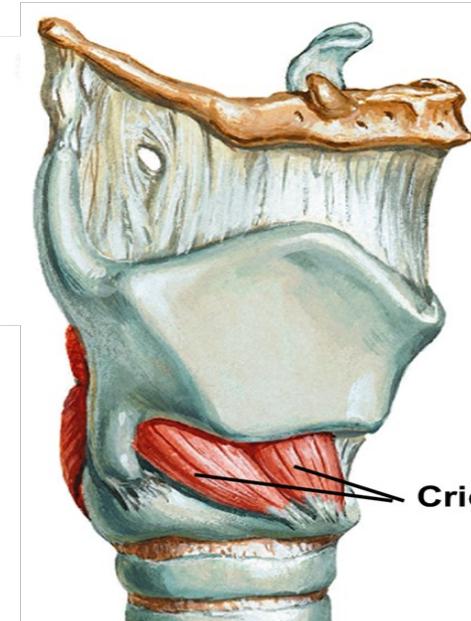


# MOVEMENTS OF MUSCLES OF THE LARYNX

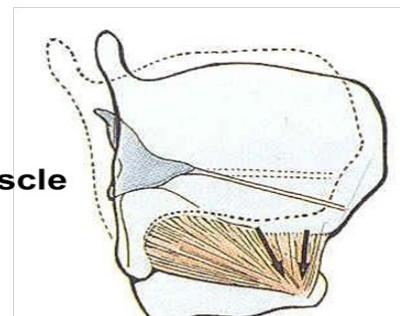
Increasing the Length = Tension  
of the Vocal Cords

Muscle shortening = relaxing  
the Vocal Cord

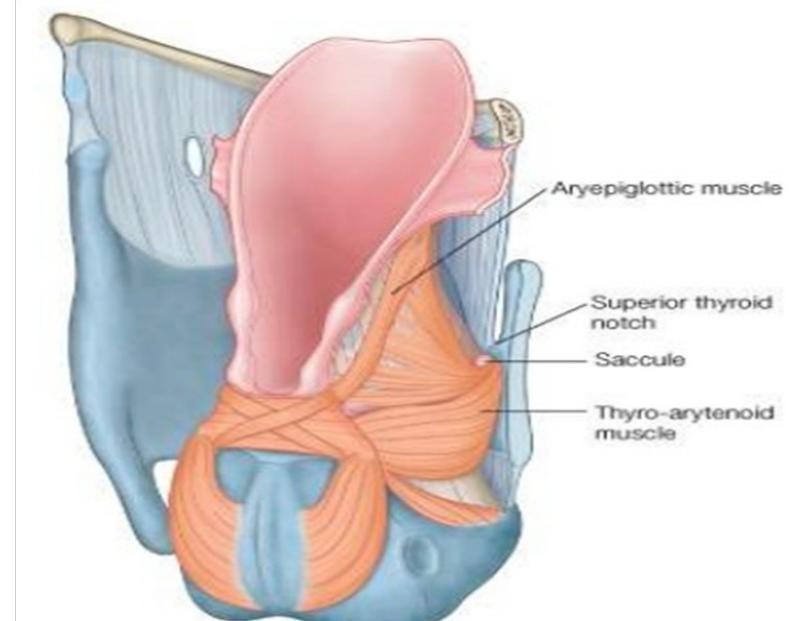
## Cricothyroid muscle



Cricothyroid muscle



## Thyro-arytenoid muscle



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# NERVE SUPPLY OF THE LARYNX



## Vagus nerve

### NERVE SUPPLY

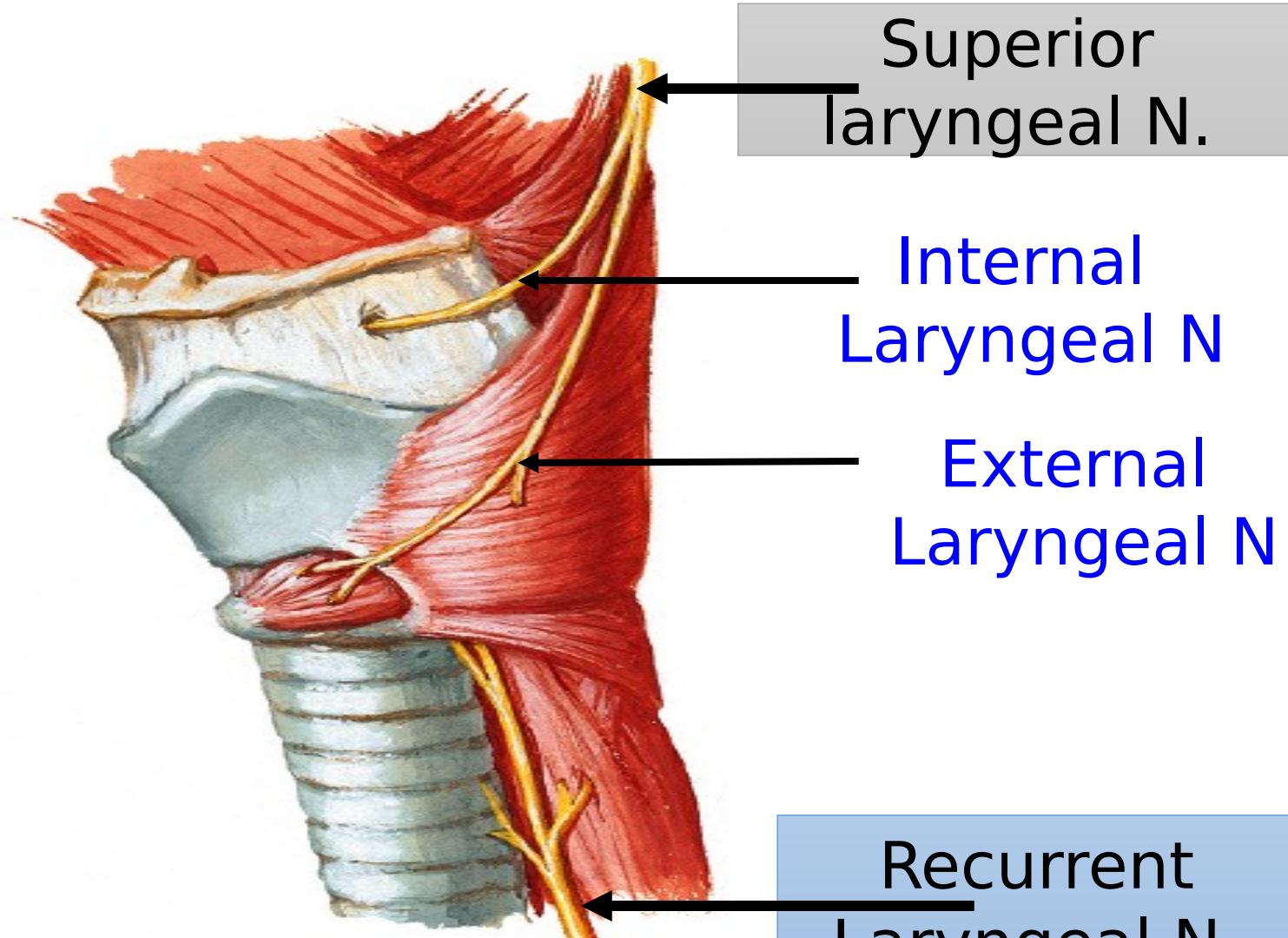
#### **Internal Laryngeal Nerve :**

only sensory

#### **External Laryngeal Nerve :**

only motor

#### **Recurrent Laryngeal Nerve :** sensory and motor



**Recurrent Laryngeal N.**

# NERVE SUPPLY OF THE LARYNX



## *Motor supply:*

**ALL** laryngeal ms. → by **recurrent laryngeal n**  
except ***cricothyroid*** → by **external laryngeal n**

## *Sensory supply:*

the mucosa **Above Vocal Cords** is supplied by **Internal Laryngeal Nerve**

the mucosa **Below Vocal Cords** is supplied by **Recurrent Laryngeal Nerve.**

## What happen if a foreign body accidentally enters larynx ?



ADAM.

## Universal sign of choking

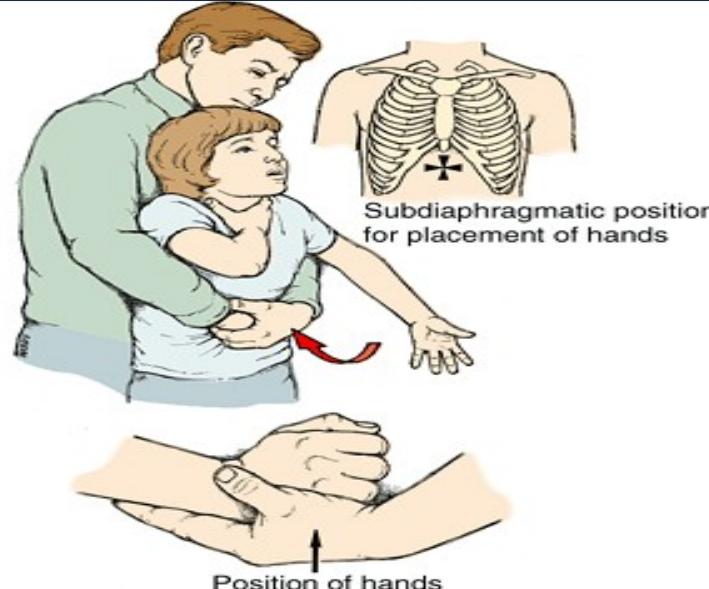
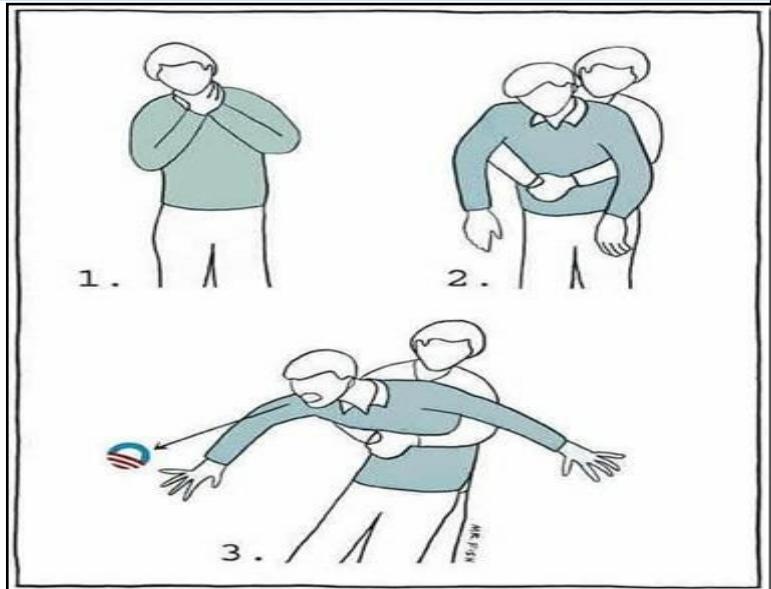


# Different Procedures for Removing Foreign Bodies in Adults and Children

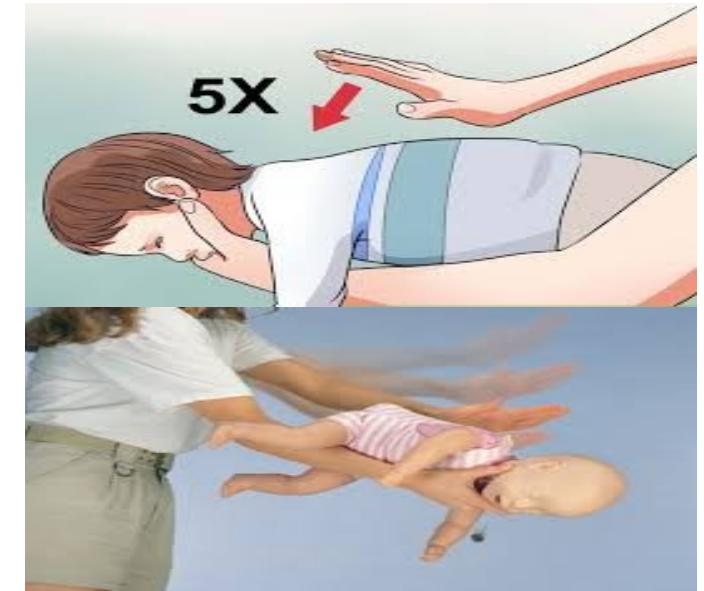
all maneuvers are directed toward the increase in intra-thoracic pressure to expel the foreign body from the airway.

## ( **Heimlich maneuver** )

children older than 1 year and for adults



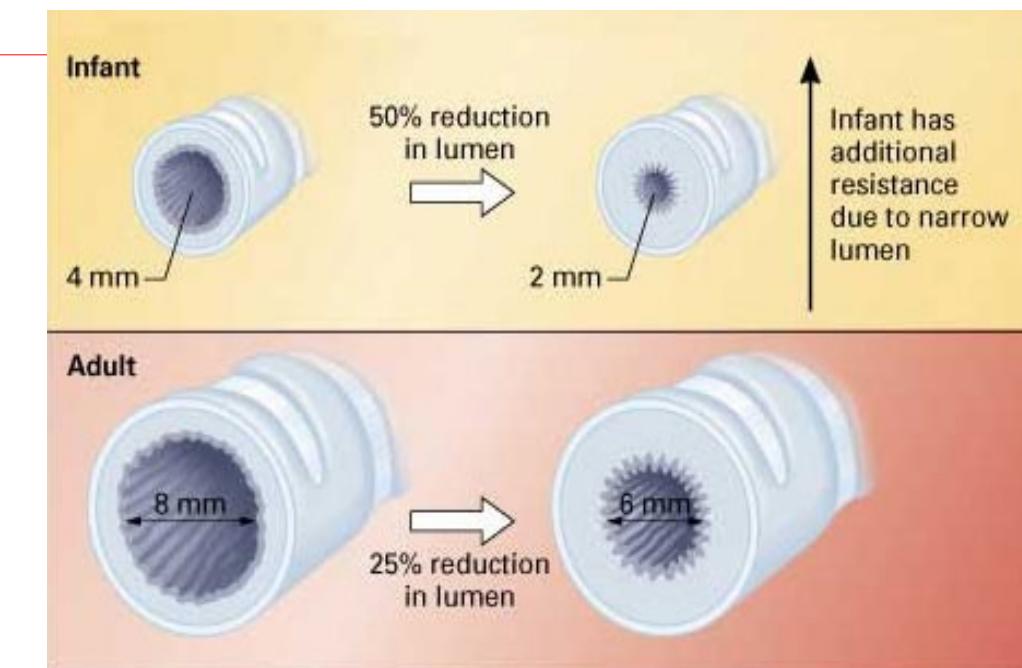
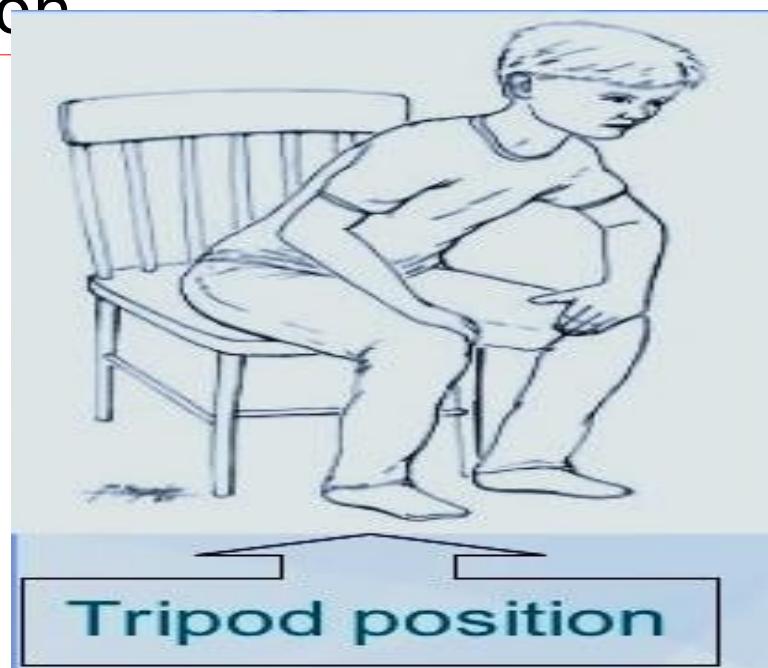
Children younger than 1 year



# Epiglottitis

An acute inflammatory swelling of the mucous membrane of the epiglottis which can compromise the upper airway.

The inflammation may spread rapidly in the loosely arranged submucosa down to the vocal cords. The condition is most often seen in children where the narrow passageway quickly leads to upper airway obstruction.

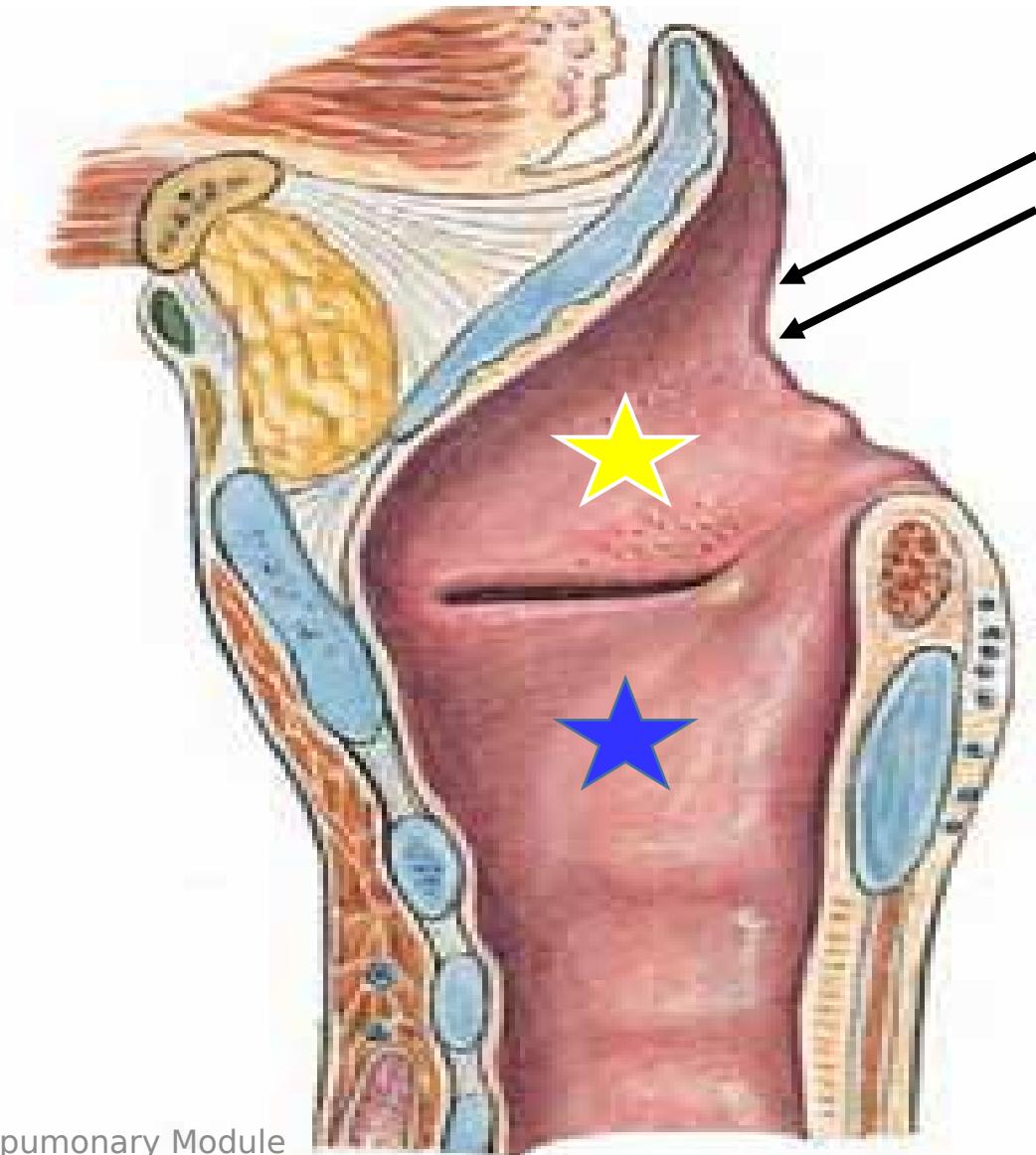


<https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rj>

# Lecture Quiz



Identify the following structures



## SUGGESTED TEXTBOOKS



*Clinical Anatomy for Medical Students .Richard S. Snell*

*Gray's anatomy for students .*